# Geotechnical Investigation Report
for
Thompson Creek Levees

Prepared for:
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Prepared by:
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June, 1999

Project No. 32921.10.100

TA 705.3 J356 T46 1999 c.1

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June 10, 1999
Project No. 32921.10.100

Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Attention: Mr. Mohammad Kahn

Subject: **Geotechnical Investigation Report**
Thompson Creek Levees
San Jose, California

Ladies/Gentlemen:

Earth Tech, Inc. (Earth Tech) is pleased to submit the results of our geotechnical investigation of the Thompson Creek Levees between Quimby Road and Westgrove Lane in central San Jose. The findings presented herein are intended to support certification of the subject levee system under Federal Emergency Management Agency guidelines.

We appreciate the opportunity to provide our services to the Santa Clara Valley Water District on this project and trust that this report meets your present needs. Please contact us if there are any questions.

Very truly yours,

Earth Tech, Inc.

Stanley H. Kline

Stanley H. Kline
Senior Geotechnical Engineer/Project Manager
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Exp. 3/31/2000

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1.0 INTRODUCTION

This report presents the results of Earth Tech's geotechnical investigation of the levee system along Thompson Creek between Quimby Road and Westgrove Lane in central San Jose. A discussion of existing geotechnical-related conditions of the levees and recommendations for improvements, as appropriate, are provided.

1.1 Project Description

The investigation project limits are shown on the location map on Figure 1-1. Specifically, the levee system encompassed by this investigation includes approximately 0.8 miles of levee embankment along both the west and east sides of Thompson Creek between the north limit at Quimby Road and the south limit in the vicinity of Westgrove Lane. The existing levees provide flood protection to the residential neighborhoods adjacent to Thompson Creek.

The primary objective of this geotechnical investigation is to develop the geotechnical-related data and evaluations that are currently lacking and needed to support certification requirements according to Federal Emergency Management Agency (FEMA) guidelines for the Thompson Creek levee system. More specifically, this involves characterization of site geotechnical levee and foundation conditions, and evaluation of levee stability and other geotechnical-related conditions according to FEMA and Corps of Engineers standard criteria. The ultimate goal is the safety certification of the subject levee system to FEMA in order for the Santa Clara Valley Water District (SCVWD) to obtain a revision to the regional flood insurance map.

1.2 Authorization

The work performed for this study by Earth Tech, as documented in this report, was authorized by the SCVWD according to Agreement No. A2173T, dated July 31, 1998. The work has been coordinated through Mr. Mohammad Kahn with the SCVWD.

1.3 Scope of Work

The work required for this investigation was outlined in Appendix One, Scope of Services, in the above-mentioned agreement. It included characterization of geotechnical conditions through field and laboratory investigations, and various geotechnical engineering analyses and evaluations to support levee certification. Specifically, the work involved in the investigation consisted of the following:

- Review of available data, including primarily construction drawings and other project documents.

- Site reconnaissance of the levee system, directed toward observation of any segments exhibiting distress or other disturbance due to instability, settlement, seepage, erosion, or other geotechnical-related adverse conditions; selection of critical and representative locations along the levees upon which to base engineering evaluations, considering cross sectional geometry and observed site conditions; and planning of the subsurface field investigation program.

- Subsurface field investigation, consisting of hollow-stem auger drilling, standard penetration testing, and sampling at a total of six exploration locations along the east levee and five exploration locations along the west levee. Two of the locations had borings at both the levee crest and levee toe. The company performing the actual drilling was contracted directly through the SCVWD.

- Geotechnical laboratory testing to evaluate index and engineering properties of levee embankment and foundation materials. The company performing the actual laboratory testing was contracted directly through the SCVWD.

- Geotechnical engineering analyses, including stability analysis and settlement, seepage, liquefaction potential, and erosion protection evaluations, as appropriate. The engineering analyses utilized the results of the field and laboratory investigations, and were based on appropriate geotechnical design criteria associated with FEMA certification guidelines.

- Report preparation, including documentation of the field and laboratory investigations and engineering analyses, conclusions regarding the existing condition of the levees, and recommendations for improvements, as appropriate.

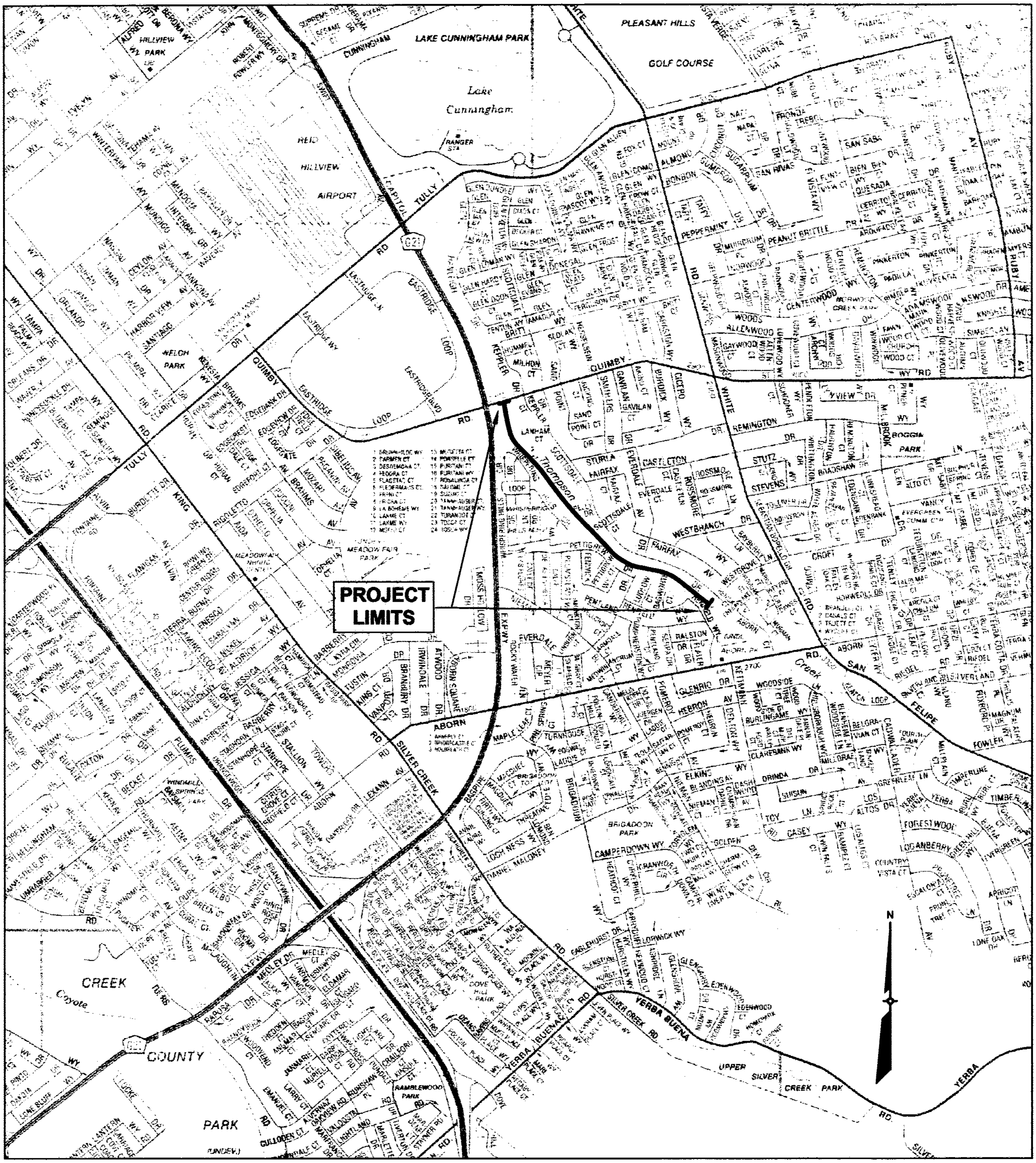
1.4 Limitations

The data, information, interpretations, and conclusions contained in this report are presented solely as bases and guides to the existing geotechnical conditions of the subject levee system. The conclusions and professional opinions presented herein were developed by Earth Tech in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied. These data, conclusions, and recommendations should be considered to relate only to the specific project and locations discussed herein. Earth Tech is not responsible for any conclusions and recommendations that may be made by others.

This report has been prepared for the express use of the SCVWD. It may not contain sufficient information for the purposes of other parties for other uses. If any changes are made in the project as described in this report, the conclusions and recommendations contained herein shall not be considered valid, unless the changes are reviewed by Earth Tech, and the conclusions and recommendations of this report are modified or approved in writing.

This report is based upon the agreed scope of services with the SCVWD indicated above and is subject to the limitations defined herein. No other person or organization is entitled to rely upon any part of the report without the prior written consent of Earth Tech. The SCVWD may release all or part(s) of this report to third parties; however, such third party, in using or relying on this report, agrees that it shall have no legal recourse against Earth Tech or its parent or subsidiaries, and shall indemnify and defend them from and against all claims arising out of or in conjunction with such use or reliance.

Soil deposits may vary in type, strength, and many other important properties between points of observation and exploration. Additionally, changes can occur in groundwater and soil moisture conditions due to seasonal variations, or for other reasons. Therefore, it must be recognized that Earth Tech does not and cannot have complete knowledge of the subsurface conditions underlying the subject project site. The opinions presented are based upon the findings at the points of exploration and upon interpretative data, including interpolation and extrapolation of information obtained at the points of observation.



BASE FROM CALIFORNIA STATE AUTOMOBILE ASSOCIATION CENTRAL SAN JOSE MAP, 1984.

0 0.2 0.4 MILES

SCALE

EARTH TECH

FIGURE 1–1
LOCATION MAP

THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

APRIL 1999

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2.0 FIELD INVESTIGATION

The field investigation of the levees within the study area, between Quimby Road and Westgrove Lane (Figure 1-1), consisted of site reconnaissance and subsurface exploration, including drilling, standard penetration testing, and sampling. The west and east levees, along with project stationing, are shown on Figures 2-1 through 2-4, prepared from original project drawing base maps. The west (right) levee reach is from TCR Station 10+00 at Quimby Road to TCR Station 50+50 at its south limit. The east (left) levee reach is from TCL Station 10+00 at Quimby Road to TCL Station 54+15 in the vicinity of Westgrove Lane at its south limit.

2.1 Site Reconnaissance

The initial site reconnaissance of the levee system was conducted on September 29 and October 6, 1998. Observations made during the reconnaissance are summarized in Table 2-1. No significant distress or other disturbance of the levee embankments due to instability, settlement, seepage, erosion, or other geotechnical-related adverse conditions was observed.

Based on the site reconnaissance and review of project drawings with as-built levee cross sections at 100-foot intervals, it was determined that the most critical section along the west levee, from a geometric standpoint, is in the vicinity of TCR Station 19+00. The most critical section along the east levee, from a geometric standpoint, was estimated to be in the vicinity of TCL Station 35+00. The locations for subsurface exploration were established during the site reconnaissance and were selected to correspond to the critical geometric sections indicated above and otherwise be spaced at regular intervals not exceeding about 1,000 feet.

2.2 Subsurface Investigation

The subsurface investigation program was initiated on October 7, 1998 and completed on October 9, 1998. Exploration drill hole locations are shown on the exploration maps on Figures 2-1 through 2-4. Ten borings, DH-1, DH-3, and DH-6 through DH-13, were drilled through the existing levee embankment and into the underlying foundation. Three additional holes were drilled into the native ground adjacent to the levee toe, DH-2 and DH-4 on the land side of the east levee, and DH-5 on the water side of the east levee. West levee crest holes (DH-9 through DH-13) were drilled to depths ranging from 24.5 to 41.5 feet. East levee crest holes (DH-1, DH-3, DH-6 through DH-8) were drilled to depths ranging from 29.5 to 36.5 feet. Levee toe holes were drilled to depths ranging from 24.5 to 27.5 feet.

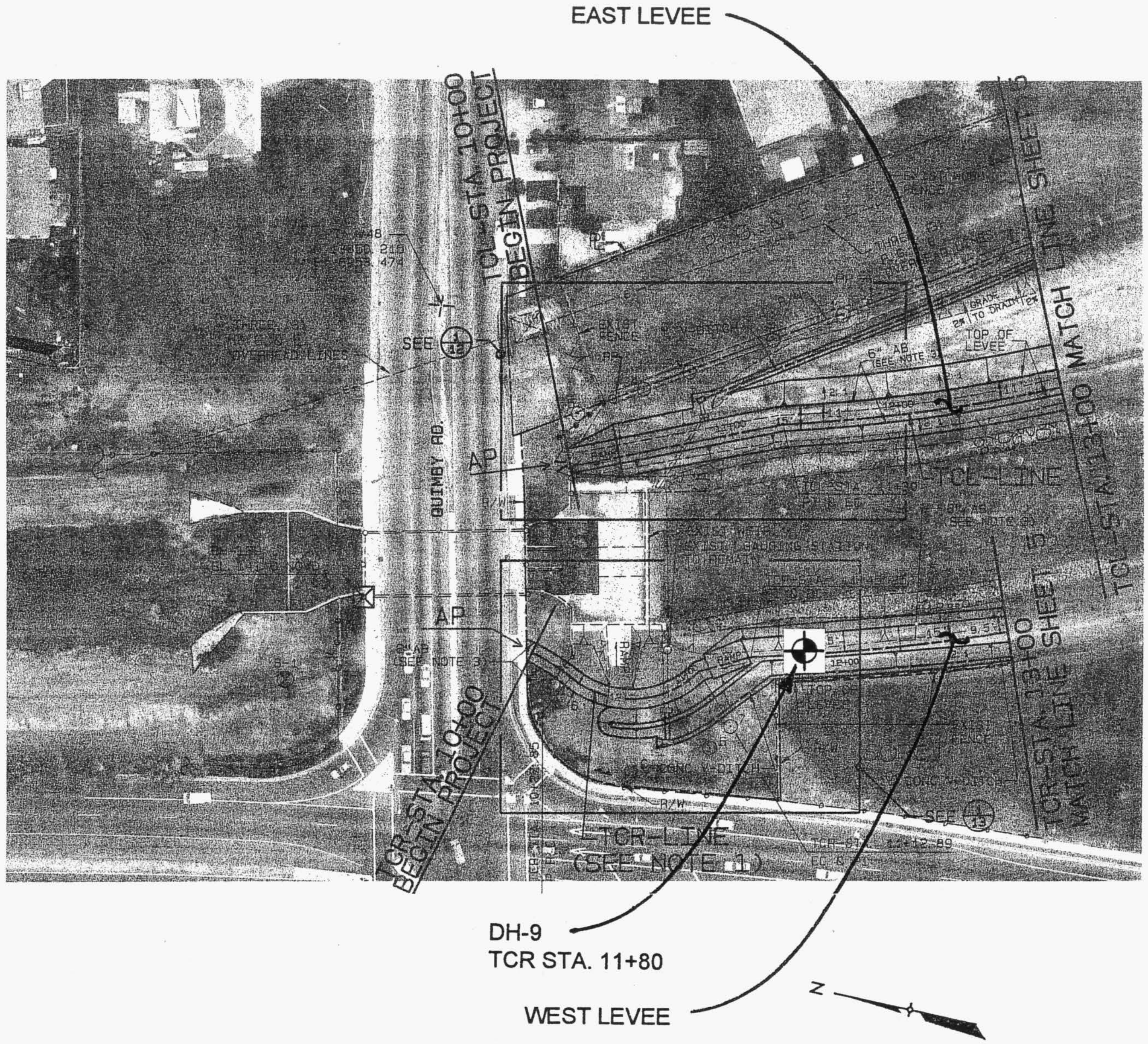
A CME 55 truck-mounted drill rig was used by Spectrum Drilling to perform the drilling and sampling. The borings were drilled using 6-inch diameter hollow stem augers. Standard penetration testing and sampling were performed in each of the drill holes at approximately 5-foot intervals. This frequency was generally increased in the levee embankment fill to retrieve an adequate supply of samples for testing and at other specific locations where a greater number of samples was desired. Disturbed soil samples were retrieved from the standard penetration test split-barrel sampler. Undisturbed sampling consisted of pushing thin-walled Shelby tubes or driving a 2.5-inch outside diameter split barrel sampler with 6-inch liners into selected fine-grained materials. The objective of the undisturbed sampling was to retrieve an ample supply of samples representative of various cohesive, fine-grained materials within the levee embankment and foundation for strength testing. Upon completion, the borings were backfilled with cement grout.

The borings were logged by an Earth Tech geologist, based on visual classification of the soils retrieved from sampling. The soils were classified in accordance with the Unified Soil Classification System. Selected standard penetration test samples representative of the various materials encountered were retained in sealed plastic bags. Undisturbed samples taken in fine-grained soils were retained in sealed Shelby tubes or 6-inch liners. All samples were properly labeled and delivered to the laboratory for testing. The field exploration boring logs are provided in Appendix A.

TABLE 2-1

SITE RECONNAISSANCE OBSERVATIONS

Levee	Approximate Station Location	Observation
East	TCL 10+50 to 12+50	minor waterside slope erosion
	TCL 17+00 to 24+00	minor landside slope desiccation cracking
	TCL 36+00 to 37+00	minor cracking at top edge of landside slope
	TCL 41+50 to 53+50	no gravel surfacing on crown
	TCL 43+00 to 47+50	localized desiccation cracking
West	TCR 11+50 to 15+00	minor waterside slope erosion
	TCR 18+50 to 19+00	minor waterside slope desiccation cracking
	TCR 35+50 to 42+50	localized desiccation cracking
	TCR 35+50 to 50+50	no gravel surfacing on crown
	TCR 41+00 to 46+00	steep low flow channel bank close to waterside toe



EXPLANATION

DH-9 ⊕ EXPLORATION DRILL HOLE (PERFORMED 10/98)

BASE FROM SANTA CLARA VALLEY WATER DISTRICT DRAWING, THOMPSON CREEK - QUIMBY ROAD TO WESTGROVE LANE - PLAN AND TCL PROFILE, SHEET 4 OF 37, DATED DECEMBER 1989.

0' 50' 100'

SCALE

L:\WORK\CAD\PROJECTS\32921\FIG2-1.DWG 04/26/99

EARTH TECH

FIGURE 2-1
EXPLORATION MAP
TCL STA 10+00 TO 13+00/TCR STA 10+00 TO 13+00
THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

APRIL 1999

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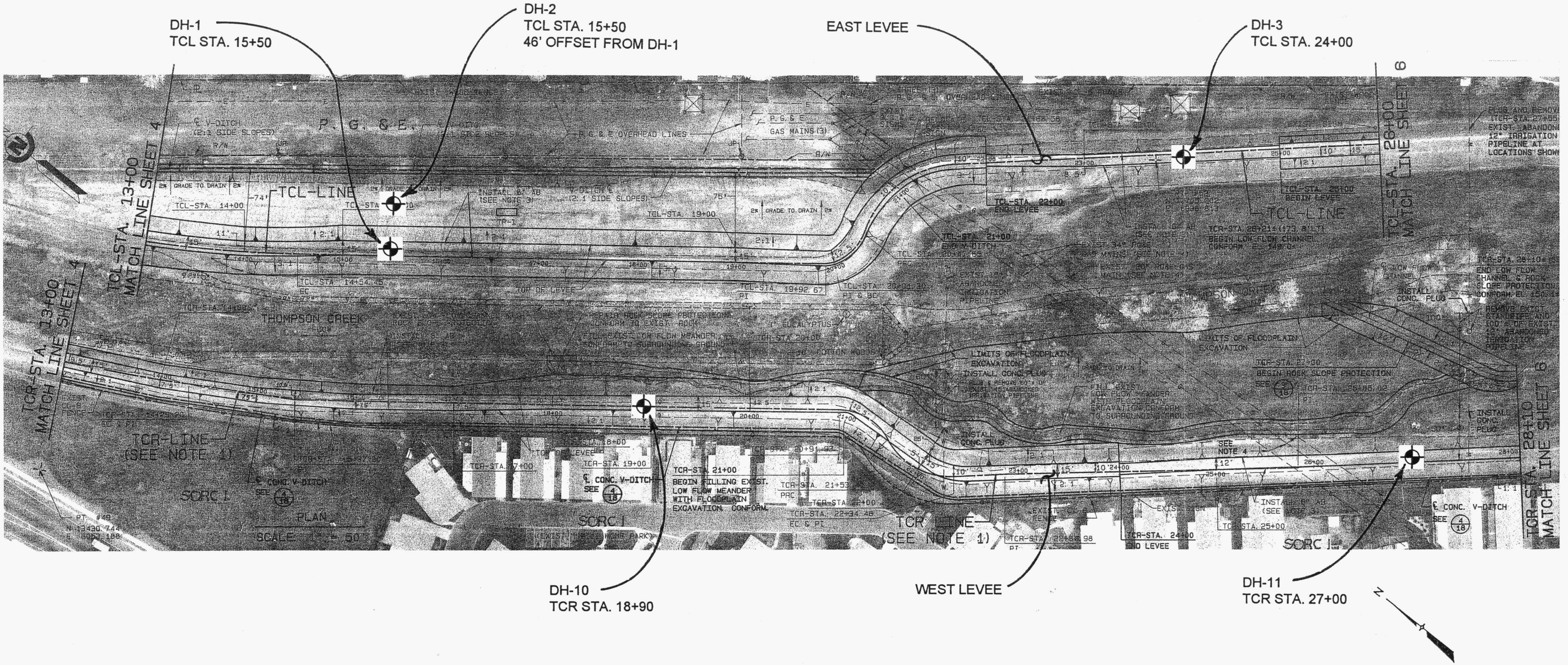

EXPLANATION

DH-1 ⊕	EXPLORATION DRILL HOLE (PERFORMED 10/98)

BASE FROM SANTA CLARA VALLEY WATER DISTRICT DRAWING,
THOMPSON CREEK - QUIMBY ROAD TO WESTGROVE LANE -
PLAN AND TCL PROFILE, SHEET 5 OF 37, DATED DECEMBER 1989.

0' 50' 100'
SCALE

EARTH TECH

FIGURE 2–2
EXPLORATION MAP
TCL STA 13+00 TO 26+00/TCR STA 13+00 TO 28+10
THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA
APRIL 1999
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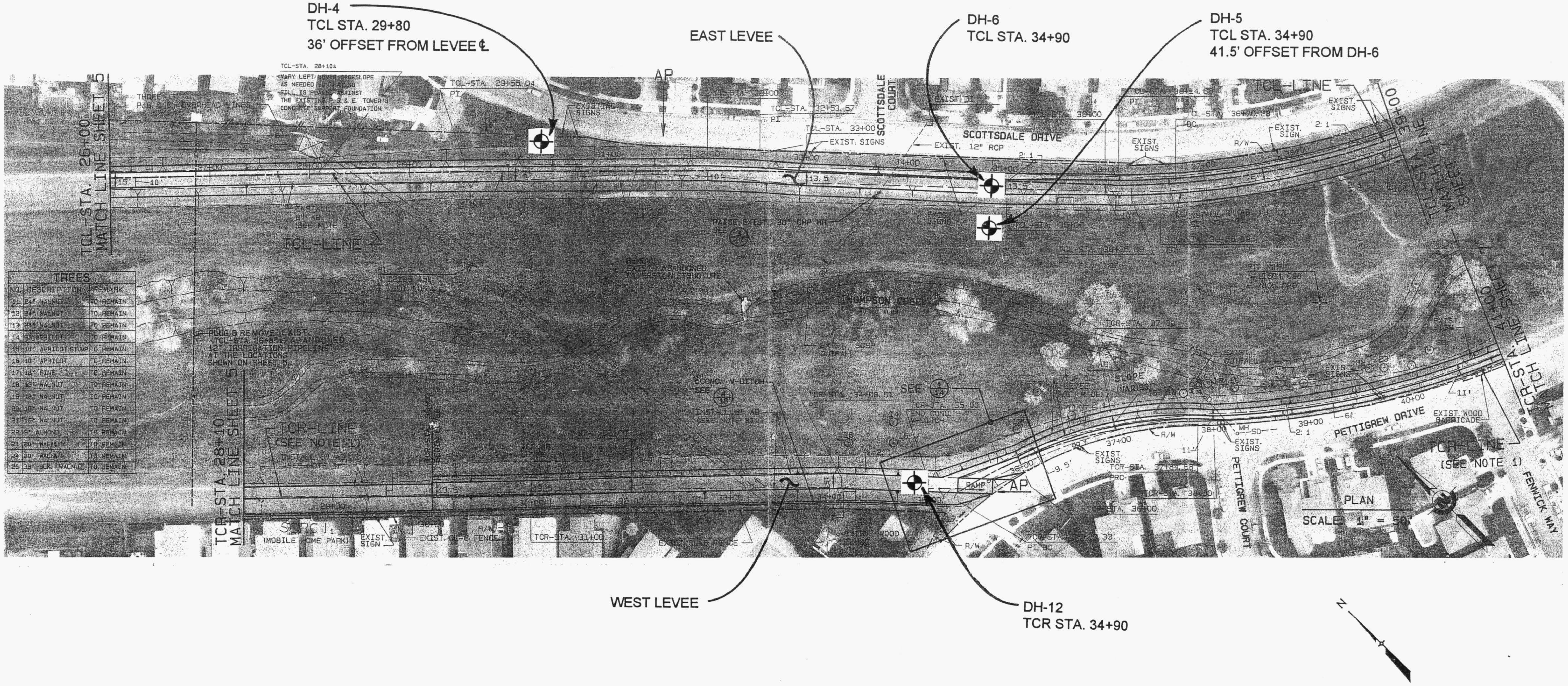

TREES		
NO.	DESCRIPTION	REMARK
11	24" WALNUT	TO REMAIN
12	24" WALNUT	TO REMAIN
13	24" WALNUT	TO REMAIN
14	9" APRICOT	TO REMAIN
15	10" APRICOT STUMP	TO REMAIN
16	10" APRICOT	TO REMAIN
17	18" PINE	TO REMAIN
18	12" WALNUT	TO REMAIN
19	18" WALNUT	TO REMAIN
20	18" WALNUT	TO REMAIN
21	16" WALNUT	TO REMAIN
22	9" ALMOND	TO REMAIN
23	20" WALNUT	TO REMAIN
24	20" WALNUT	TO REMAIN
25	36" BLK. WALNUT	TO REMAIN

EXPLANATION

DH-4 ⊕ EXPLORATION DRILL HOLE (PERFORMED 10/98)

BASE FROM SANTA CLARA VALLEY WATER DISTRICT DRAWING,
THOMPSON CREEK - QUIMBY ROAD TO WESTGROVE LANE -
PLAN AND TCL PROFILE, SHEET 6 OF 37, DATED DECEMBER 1989.

0' 50' 100'
SCALE

E A R T H T E C H

FIGURE 2–3
EXPLORATION MAP
TCL STA 26+00 TO 39+00/TCR STA 28+10 TO 41+00
THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA
APRIL 1999
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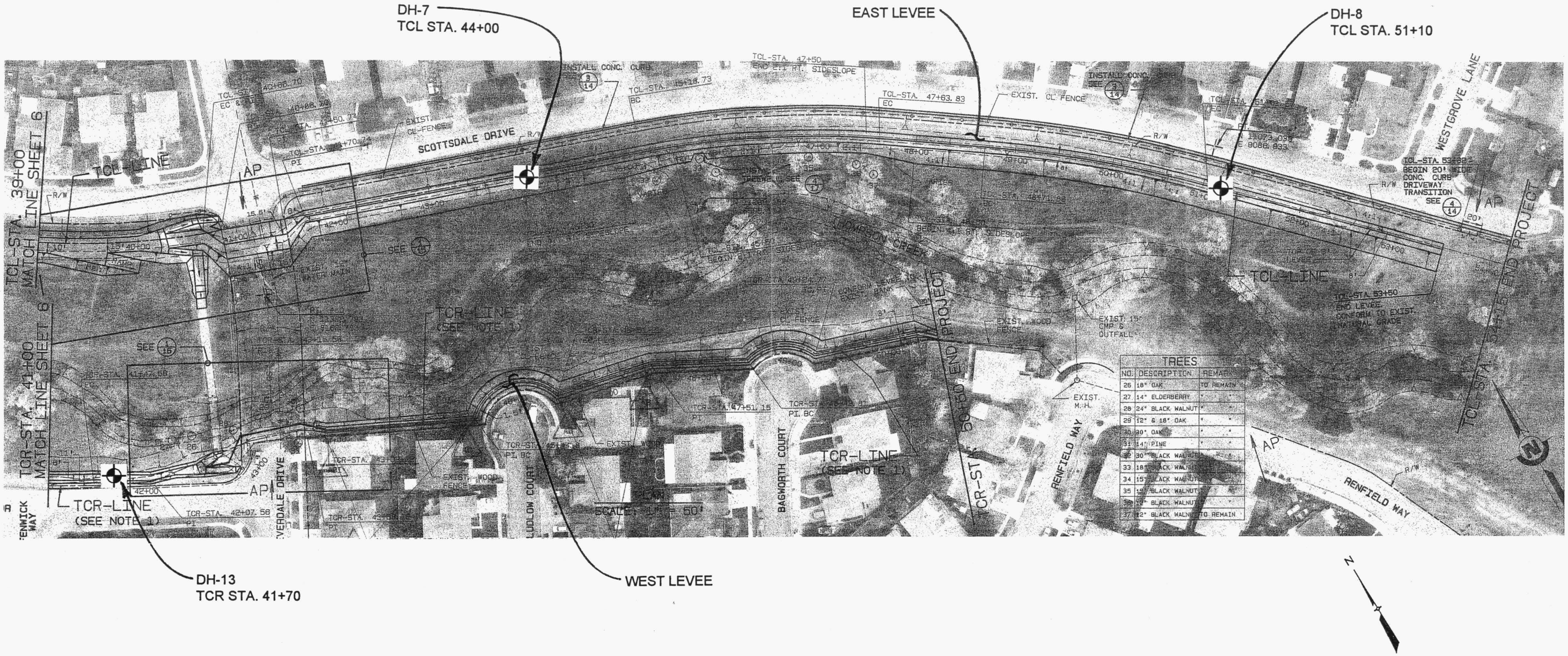
L:\WORK\CAD\PROJECTS\32921\FIG2-3.DWG 04/26/99



TREES		
NO.	DESCRIPTION	REMARK
26	18" OAK	TO REMAIN
27	14" ELDERBERRY	" "
28	24" BLACK WALNUT	" "
29	12" & 18" OAK	" "
30	30" OAK	" "
31	14" PINE	" "
32	30" BLACK WALNUT	" "
33	18" BLACK WALNUT	[illegible]
34	15" BLACK WALNUT	[illegible]
35	15" BLACK WALNUT	" "
36	12" BLACK WALNUT	" "
37	12" BLACK WALNUT	TO REMAIN

EXPLANATION

DH-7 ⊕ EXPLORATION DRILL HOLE
(PERFORMED 10/98)

BASE FROM SANTA CLARA VALLEY WATER DISTRICT DRAWING,
THOMPSON CREEK - QUIMBY ROAD TO WESTGROVE LANE -
PLAN AND TCL PROFILE, SHEET 7 OF 37, DATED DECEMBER 1989.

0' 50' 100'
SCALE

EARTH TECH

FIGURE 2–4
EXPLORATION MAP
TCL STA 39+00 TO 54+15/TCR STA 41+00 TO 50+50
THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

APRIL 1999

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3.0 LABORATORY INVESTIGATION

The laboratory program for the existing levees investigation consisted of index properties testing and engineering properties testing of selected levee embankment and foundation soil samples retrieved from the subsurface exploration activities. The material properties determined from the laboratory testing, along with other field investigation observations, are used to characterize existing geotechnical conditions and select appropriate geotechnical parameters for use in the engineering analyses. The laboratory testing program was developed by an Earth Tech geotechnical engineer. During the process of formulating the program, all samples retrieved from the subsurface investigation were visually examined for comparison of material type against the field boring log and determination of suitability for testing. The actual laboratory testing work was performed by Dames & Moore. All of the individual test results, raw data, and test results summaries can be found in their laboratory testing report to the SCVWD (Dames & Moore, 1999). The key data of the individual test results is extracted from the Dames & Moore report and presented in Appendix B for reference and convenience.

The index properties testing included the determination of natural water content and dry density, grain-size distribution, and Atterberg limits for selected levee embankment and foundation samples. The engineering properties testing consisted of maximum density/optimum moisture (compaction), consolidation, unconfined compression, direct shear, and triaxial compression testing.

In developing the laboratory testing program and selecting the samples for various tests, the following objectives were considered:

- Representative coverage for index properties testing over the borings and depths explored and various material types encountered.

- Engineering properties testing of materials judged to be representative and encompassing weaker materials, based on observations during exploratory drilling, the results of visual examination, and index properties testing.

- Strength testing of the same or similar materials by a certain number of different types of tests for correlating strength and test type.

- Representative coverage for strength testing over the borings and depths explored and various material types encountered, by the formulation of a cost-effective program using various types of strength tests on the various samples from different borings and reliance on the correlation of strength and test type from the previous objective.

- Engineering properties testing of the same materials from adjacent borings in the loaded and unloaded levee foundation for comparison of properties under the two conditions.

4.0 GEOTECHNICAL SITE CONDITIONS

Based on the results of the field and laboratory investigations, four material designations were established for the purpose of summarizing material properties. These material designations are as follows:

- Levee fill.
- Levee foundation.
- Adjacent natural ground.
- Coarser material at depth.

None of the results from field and laboratory observations and testing provided any basis for representing the levee fill and foundation conditions in any more detailed a fashion than that represented by the material designations established above. In fact, use of some of these material designations in representing site conditions was considered unnecessary in some of the engineering analyses.

The existing levee embankment fill (west and east levees) within the 0.8-mile long project area generally consists of a sandy clay of low to moderate plasticity. Some moderate to highly plastic materials were encountered, generally toward the southern end of both the west and east levees. The levee fill varies in height up to a maximum of about 7 feet along the east levee and up to a maximum of about 10 feet along the west levee.

The foundation beneath the existing levees and the adjacent natural ground, where explored, generally consists of a sandy clay of moderate plasticity. Some localized, more granular materials consisting of silty and clayey sand, and in some cases well-graded sand, generally at depths below 20 feet in the foundation, were encountered. The well-graded sand was typically found along the central area of the west levee (DH-10 through DH-13).

Groundwater conditions estimated during the exploratory drilling indicate water levels at depths in the range of 10 to 15 feet in the foundation in the northern area, and depths in the range of 15 to 20 feet in the foundation in the central and southern area of the levees.

The following sections provide a summary of the existing levee embankment and foundation material properties and also discuss the basis for the selection of design parameters, as appropriate.

4.1 Gradation Characteristics

The results of gradation tests on samples of material from the existing levee fill and foundation are summarized, in terms of average percent sand and gravel-sized particles and silt and clay-sized particles, in Table 4-1. Refer to Appendix B for the individual test results.

4.2 Plasticity Characteristics

The results of Atterberg limits determinations on samples of existing levee fill and foundation materials are summarized, in terms of plastic limit, liquid limit, and plasticity index ranges, in Table 4-2. Refer to Appendix B for the individual test results.

4.3 Natural Water Content and Dry Density

The results of 57 natural water content and dry density tests on undisturbed samples of existing levee fill and foundation materials are listed in Appendix B. The ranges of natural water contents and dry densities for the samples tested, along with the moist unit weights selected for use in engineering analyses, are summarized in Table 4-3.

4.4 Maximum Density and Relative Compaction

Three compaction tests were performed on bulk samples of representative levee embankment fill materials collected in the vicinity of DH-6, DH-10, and DH-12. The tests were performed using a compactive effort according to ASTM D1557, the same standard upon which fill placement construction specification requirements for relative compaction were based. The purpose for the compaction testing was to allow comparison of in-place densities to maximum density and assessment of the degree of compaction within the existing levee fill relative to the original earthwork specification requirement of fill construction to a minimum relative compaction of 90 percent (ASTM D1557). Comparison of measured in-place embankment fill dry densities to laboratory compaction maximum dry densities at the three locations where compaction curve samples were retrieved is provided in Table 4-4. Refer to Appendix B for the individual compaction test results. The data compared in Table 4-4 indicates the degree of compaction of the levee embankment fill to generally exceed the original required minimum.

4.5 Consolidation

Four consolidation tests were performed on undisturbed samples of foundation materials in order to evaluate the settlement characteristics of the most compressible materials. The results of the individual consolidation tests are provided in Appendix B.

4.6 In-Situ Undrained Shear Strength

The determination of in-situ undrained shear strength properties of existing levee fill and foundation materials was made from unconfined compression and triaxial compression testing on undisturbed samples. The range of undrained shear strengths determined from unconfined compression tests and unconsolidated undrained triaxial compression tests for the undisturbed samples tested are summarized in Table 4-5. Refer to Appendix B for the individual test results. The undrained shear strengths selected for use in defining soil parameters for stability analyses are also indicated in Table 4-5. It is noted that the selected values for engineering analysis are significantly lower than the actual test data due to a concern that laboratory test conditions may have produced unrealistically high strength results relative to actual anticipated field conditions.

4.7 Consolidated Undrained Shear Strength

Consolidated undrained triaxial compression tests and consolidated drained direct shear tests were performed on undisturbed samples of existing levee fill and foundation materials. The specimens were consolidated under a range of pressures to encompass existing loading conditions and were then failed in an undrained condition for the triaxial tests and a drained condition for the direct shear tests. Pore pressures were measured during the triaxial tests so that shear strength parameters for both the total stress and effective stress conditions could be determined. The confining pressures on the samples ranged from 5 to 30 psi. The total stress and effective stress shear strength results of the triaxial compression and direct shear tests are summarized on three charts in the form of Mohr-Coulomb strength envelopes. The results for the levee fill materials are presented on Figure 4-1. The results for the levee foundation materials are presented on Figure 4-2. The results for the adjacent natural ground materials are presented on Figure 4-3. Refer to Appendix B for the individual test results. The total and effective stress envelopes selected for use in defining soil parameters for stability analyses are also indicated on the three charts (Figures 4-1 through 4-3). They are based on selecting lower bound envelopes below the test data.

TABLE 4-1

GRADATION CHARACTERISTICS

Material Designation[1]	Number of Tests	Average Percent Sand and Gravel[2]	Average Percent Silt and Clay[3]
1	8	46	54
2 and 3	10	31	69
4	6	82	18

Notes:

[1] 1 – Levee fill.
2 – Levee foundation.
3 – Adjacent natural ground.
4 – Coarser material at depth.

[2] Plus No. 200 sieve size.

[3] Minus No. 200 sieve size.

TABLE 4-2

PLASTICITY CHARACTERISTICS

Material Designation[1]	Number of Tests	Plastic Limit Range, percent	Liquid Limit Range, percent	Plasticity Index Range, percent
1	8	16-33	29-57	13-34
2 and 3	8	17-20	32-51	15-31
4	0	-	-	-

Notes:

[1] 1 – Levee fill.
2 – Levee foundation.
3 – Adjacent natural ground.
4 – Coarser material at depth.

TABLE 4-3

NATURAL WATER CONTENT AND DRY DENSITY

Material Designation[1]	**Natural Water Content**		**Natural Dry Density**		**Selected Moist Density for Engineering Analysis, pcf**
	Number of Tests	**Data Range, percent**	**Number of Tests**	**Data Range, pcf**	
1	20	10-19	20	101-126	130
2	20	11-26	20	86-116	120
3	17	8-26	17	96-118	120
4	0	-	-	-	N/A

Notes:

[1] 1 – Levee fill.
2 – Levee foundation.
3 – Adjacent natural ground.
4 – Coarser material at depth.

TABLE 4-4

MAXIMUM DENSITY AND RELATIVE COMPACTION

Location	Depth, feet	In-Place Dry Density, pcf	Laboratory Maximum Dry Density,[1] pcf	Relative Compaction,[2] percent
DH-6	5.5 - 6	115.3	130.7	88
	6 - 6.5	123.3	130.7	94
DH-10	2.5 - 3	113.3	121.8	93
	3 - 3.5	104.6	121.8	86
	4.5 - 5	120.7	121.8	99
	5 - 5.5	123.0	121.8	100+
	6 - 8	125.9	121.8	100+
DH-12	2.5 - 3	121.2	130.2	93
	3 - 3.5	125.2	130.2	96

Notes:

[1] ASTM D1557.

[2] Original earthwork construction specifications required a minimum of 90 percent.

TABLE 4-5

IN-SITU UNDRAINED SHEAR STRENGTH

Test	**In-Situ Undrained Shear Strength Range for Material Designation,[1] psf**		
	1	**2**	**3**
Unconfined Compression[2]	2,834 - 3,414	1,522 - 2,342	733 - 3,661
Unconsolidated Undrained Triaxial Compression[3]	2,830 - 3,395	1,623 - 3,144	540 - 1,188
Selected Engineering Analysis Value[4]	1,000	500	500

Notes:

[1] 1 – Levee fill.
2 – Levee foundation.
3 – Adjacent natural ground.

[2] Number of tests: Material 1: 2, Material 2: 3, Material 3: 2.

[3] Number of tests: Material 1: 2, Material 2: 3, Material 3: 2.

[4] See Section 4.6.

L:\WORK\CAD\PROJECTS\32921\FIG4-1.DWG 04/28/99

STRENGTH TEST NUMBER	TEST TYPE	HOLE	SAMPLE	DEPTH (FEET)	SOIL TYPE
1	CU	DH-6	L-1B	6-6.5	SC
2	CU	DH-8	L-1B	2.5-3	CH
3	CU	DH-10	L-2B	5-5.5	SC
4	CU	DH-10	S-1	6-8	SC
5	CU	DH-11	L-2B	6-6.5	CL
6	DS	DH-9/10	L-2A/L-1B	5.5-6/3-3.5	CL

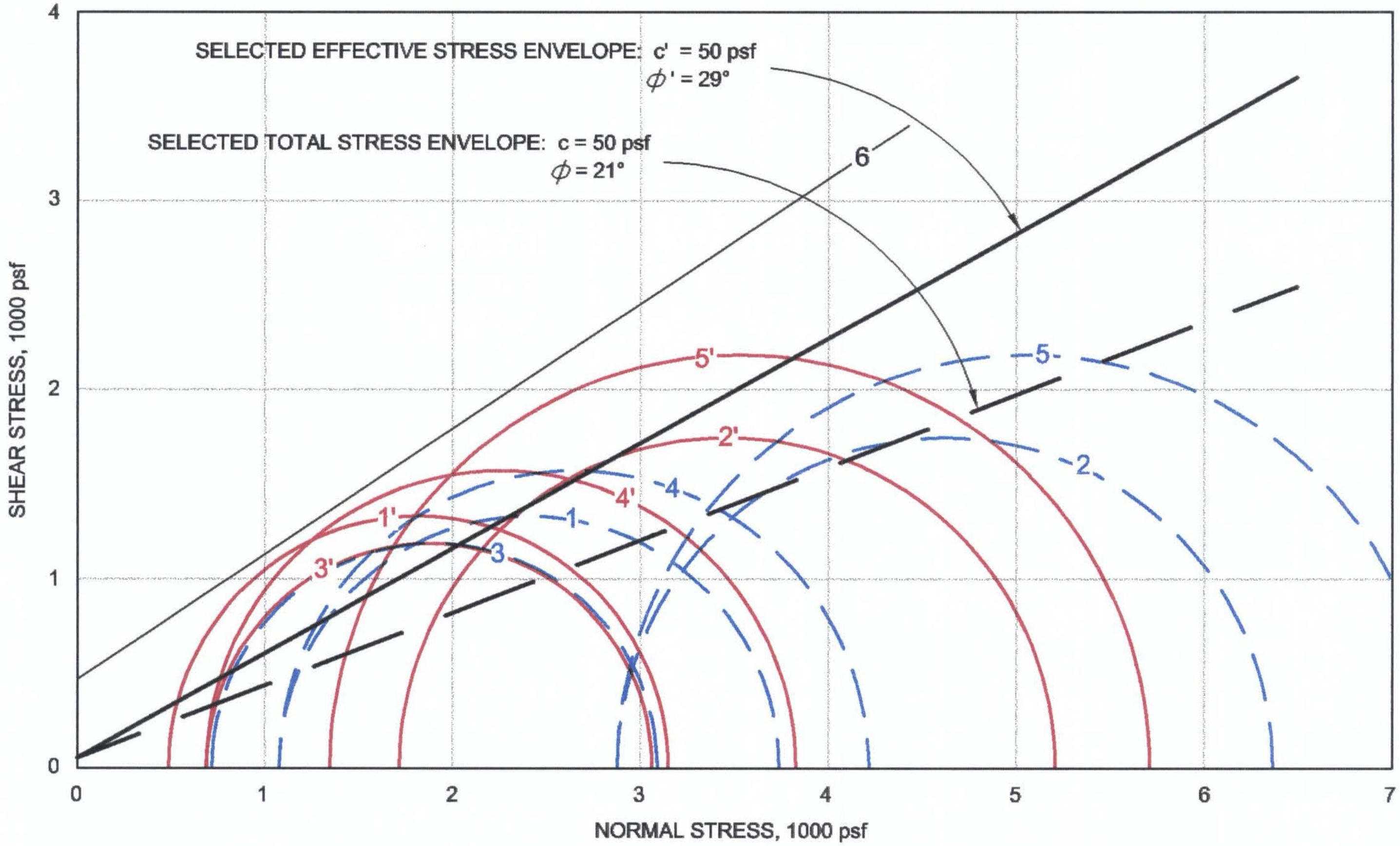
EXPLANATION

CU - CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

DS - CONSOLIDATED DRAINED TRIAXIAL COMPRESSION

1 MOHR-COULOMB TOTAL STRESS CIRCLE

1' MOHR-COULOMB EFFECTIVE STRESS CIRCLE



SELECTED EFFECTIVE STRESS ENVELOPE: c' = 50 psf
ϕ' = 29°

SELECTED TOTAL STRESS ENVELOPE: c = 50 psf
ϕ = 21°

MATERIAL: LEVEE FILL

E A R T H T E C H

FIGURE 4–1

LEVEE FILL
SHEAR STRENGTH TEST PARAMETERS

THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

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L:\WORK\CAD\PROJECTS\32921\FIG4-2.DWG 04/28/99

STRENGTH TEST NUMBER	TEST TYPE	HOLE	SAMPLE	DEPTH (FEET)	SOIL TYPE
1	CU	DH-1	S-2	18-20	CL-CH
2	CU	DH-6	S-1	10-12	CL
3	CU	DH-10	S-3	13.5-15	CL-CH
4	DS	DH-3	S-1	10-12	CL-CH

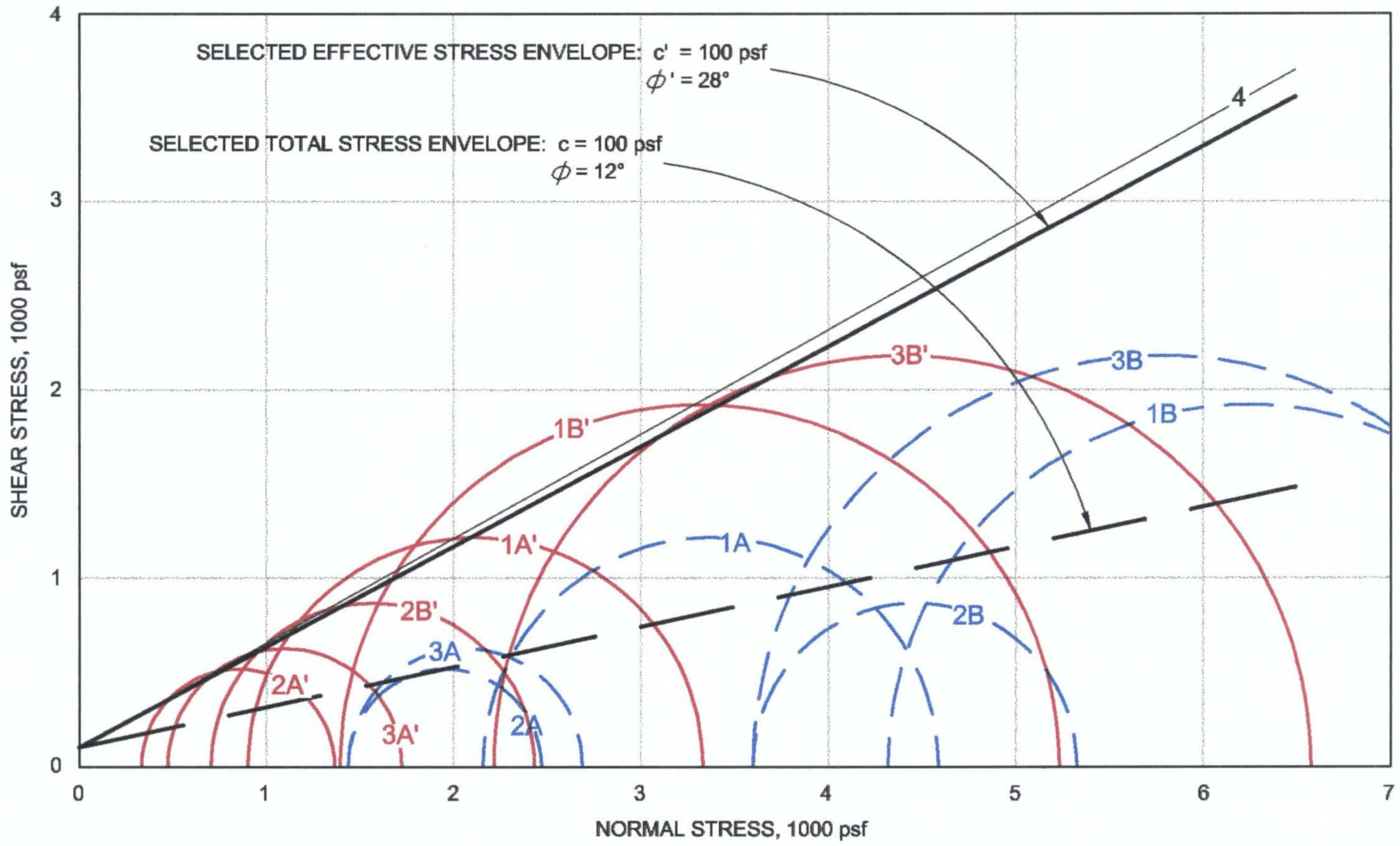
EXPLANATION

CU - CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

DS - CONSOLIDATED DRAINED TRIAXIAL COMPRESSION

1A MOHR-COULOMB TOTAL STRESS CIRCLE

1A' MOHR-COULOMB EFFECTIVE STRESS CIRCLE



SELECTED EFFECTIVE STRESS ENVELOPE: c' = 100 psf
ϕ' = 28°

SELECTED TOTAL STRESS ENVELOPE: c = 100 psf
ϕ = 12°

MATERIAL: LEVEE FOUNDATION

EARTH TECH

FIGURE 4-2

LEVEE FOUNDATION SHEAR STRENGTH TEST PARAMETERS

THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

APRIL 1999

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L:\WORK\CAD\PROJECTS\32921\FIG4-3.DWG 04/28/99

STRENGTH TEST NUMBER	TEST TYPE	HOLE	SAMPLE	DEPTH (FEET)	SOIL TYPE
1	CU	DH-2	S-2	12-14	CL
2	CU	DH-4	S-2	16-18	SC
3	DS	DH-2	S-1	5.6-7	CL-CH
4	DS	DH-5	S-2	23.5-25	CL

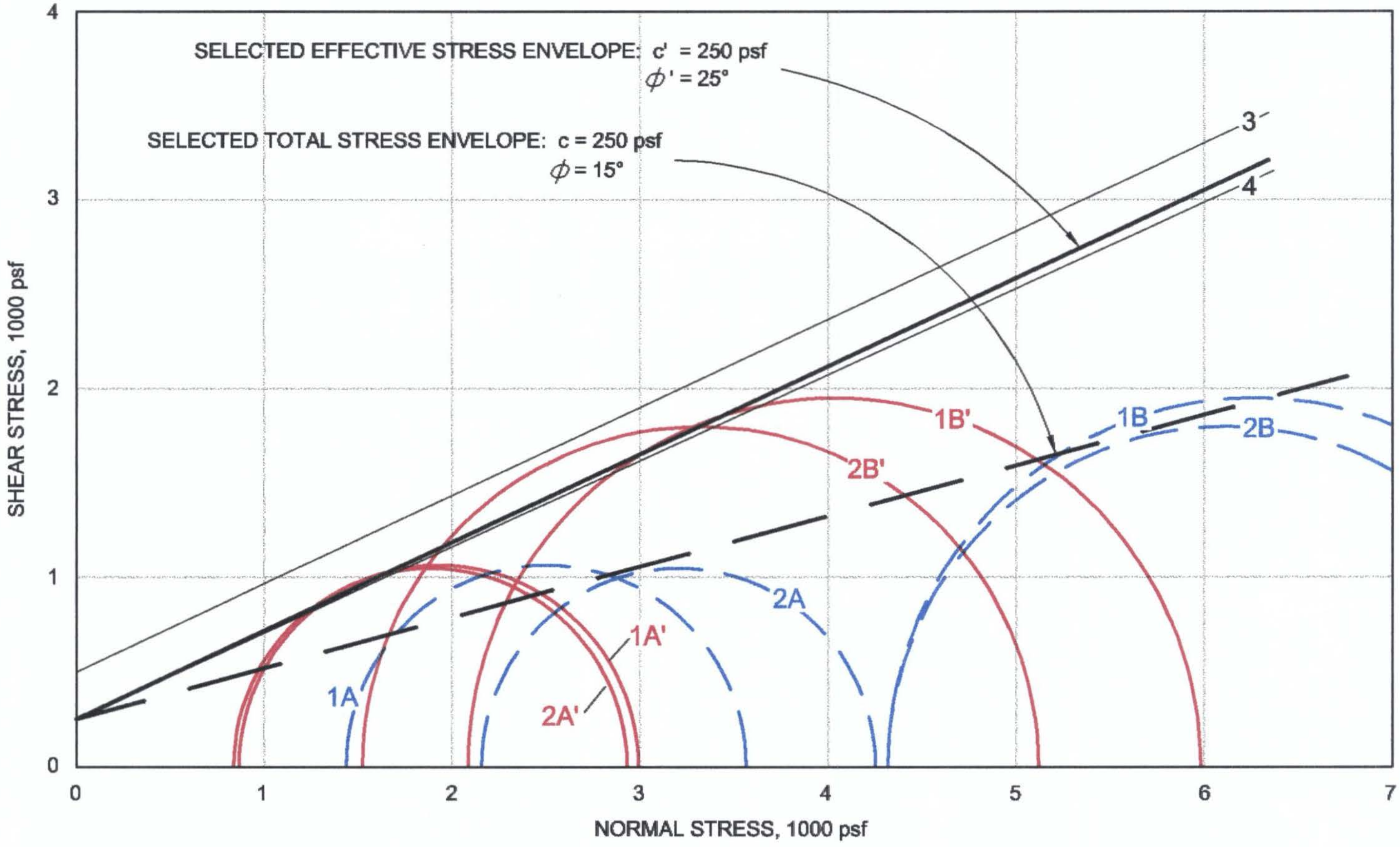
EXPLANATION

CU - CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION

DS - CONSOLIDATED DRAINED TRIAXIAL COMPRESSION

1A MOHR-COULOMB TOTAL STRESS CIRCLE

1A' MOHR-COULOMB EFFECTIVE STRESS CIRCLE



MATERIAL: ADJACENT NATURAL
GROUND

EARTH TECH

FIGURE 4–3

ADJACENT NATURAL GROUND
SHEAR STRENGTH TEST PARAMETERS

THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

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5.0 GEOTECHNICAL ENGINEERING EVALUATION

Based on the results of the field and laboratory investigations and the selection of certain material parameters discussed in the previous section, geotechnical engineering evaluation of the existing levee system was performed using appropriate geotechnical design criteria associated with FEMA certification guidelines. The evaluation has included stability analyses and settlement, seepage, liquefaction potential, and erosion protection evaluations, as appropriate.

5.1 Stability

The levee embankment and its foundation are subjected to a number of forces which are critical under certain conditions. The stability of the levee depends on the action of these forces. Forces that the levee embankment and foundation must resist for adequate stability include the weight of embankment material, unbalanced external water forces, and internal seepage forces. Transient loading conditions, such as those imposed during an earthquake, also may affect levee stability. Resistance of these forces by the inherent shear strength of the earth materials comprising the levee embankment and by the natural foundation materials will provide a certain level of stability for the levee.

The performance of the levee and foundation under these forces and critical conditions is determined by performing stability analyses. The analyses were performed for the waterside and landside slopes of critical cross sections in accordance with criteria associated with FEMA certification guidelines. Conventional limit equilibrium methods were used to determine factors of safety against sliding. Seismic loading conditions were approximated by pseudostatic analyses. Engineering parameters consisting of the geometry of the levee embankment and foundation, and the unit weight and shear strength properties of the levee embankment and foundation materials were the bases of the analyses. Several stability conditions were analyzed to obtain the minimum factors of safety during these conditions over the life of the levee system. Computer analyses assisted in defining minimum safety factors and allowed numerous cases to be studied. A description of the analyses performed to evaluate the adequacy of the existing levee stability, and the results obtained, are presented in the following sections.

5.1.1 Criteria

The existing levee system was evaluated to meet minimum stability criteria in accordance with the Corps of Engineers Engineering Manual EM 1110-2-1913 (Corps of Engineers, 1978) per FEMA guidelines. These criteria are as follows:

- Minimum stability criteria according to Engineering Manual EM 1110-2-1913, listed below:

Condition	Minimum Required Factor of Safety
End of Construction	1.3
Sudden Drawdown	1.0
Intermediate Stage	1.4
Steady Seepage, Flood Stage	1.4
Earthquake	1.0

- Pseudostatic coefficient of 0.15g used to analyze for seismic loading conditions.

5.1.2 Cross Sections for Analysis

The stability analyses were performed on the most critical sections, based on cross section geometry, for both the west and east levees, as discussed in Section 2.1. The existing levee embankment and foundation cross sections used for the analyses are shown on Figure 5-1. The analysis utilized material parameters for only two of the four material designations discussed in Section 4.0, the levee fill and levee foundation materials, as indicated on Figure 5-1. Material strengths were not found to be weaker in adjacent natural ground materials; so, no differentiation was made between foundation materials beneath the levee and those adjacent to the levee. The localized coarser materials at depth in the foundation were not represented in the analysis for simplification; this is considered conservative, since the more granular materials would tend to have higher strengths. The various external water levels and internal phreatic surfaces used for various analysis conditions are also indicated on Figure 5-1.

5.1.3 Engineering Parameters

Shear strength parameters for use in stability analyses were determined in accordance with the criteria in Engineering Manual EM 1110-2-1913, summarized below for this study:

Condition	**Shear Strength**
End of Construction	Q
Sudden Drawdown	S where <R
	R where <S
Intermediate Stage	S where <R
	$\frac{R+S}{2}$ where R<S
Steady Seepage, Flood Stage	S where <R
	$\frac{R+S}{2}$ where R<S
Earthquake	Shear strength applicable for case analyzed

where:
Q = unconsolidated undrained shear strength (total stress)
R = consolidated undrained shear strength (total stress)
S = consolidated drained shear strength (effective stress)

As described in Section 4.7, pore pressure measurements during consolidated undrained triaxial tests allowed the determination of shear strength for the effective stress condition. This was substituted for the S strength in the above criteria (R, the consolidated undrained effective stress shear strength is equivalent to S, the consolidated drained effective stress shear strength).

Based on the engineering parameters selected from field and laboratory investigations, discussed in Section 4.0, and the criteria for using these parameters in stability analyses according to Engineering Manual EM 1110-2-1913, the soil parameters used for the stability analyses are summarized in Table 5-1. The shear strength parameters used for the various conditions analyzed for the levee fill and foundation materials are also presented on Figures 5-2 and 5-3, respectively, in the form of Mohr-Coulomb strength envelopes.

5.1.4 Conditions Analyzed

Several slope stability cases for both the waterside and landside embankment slopes of the existing levees were analyzed. The conditions analyzed are listed below:

- End of construction – waterside and landside slopes.

- Sudden drawdown – waterside slope: analysis with phreatic surface corresponding nearly to that for the steady seepage, flood stage condition with no external water load.

- Intermediate stage – waterside slope: analysis with water level corresponding to a minimum factor of safety for this condition.

- Steady seepage, flood stage – landside slope: analysis with water level corresponding to the design flood plane with a minimum freeboard of 3 feet.

A total stress analysis was used to analyze the end of construction condition using shear strength parameters based on total stress shear strengths from tests used to measure in-situ undrained shear strengths. By the use of these parameters, the analysis accounts for excess pore pressures that would be present until the soil has time to consolidate and drain after being loaded.

Effective stress analyses were used to analyze long term conditions, associated with the intermediate and flood stage study seepage conditions, using shear strength parameters based on the average of total stress and effective stress envelopes from consolidated undrained triaxial and direct shear tests. The use of strengths midway between the total and effective stress envelopes is in accordance with Engineering Manual EM 1110-2-1913. The effective stress analysis assumes pore pressures to be in equilibrium with no excess pore pressures present. Pore pressures used in the stability analyses for the long term conditions were conservatively estimated by the assumption of vertical equipotential lines below the phreatic surface within the levee embankment. Pore pressures within the levee embankment and foundation were taken as being equal to a head of water with a vertical distance between the point of interest and the water level or phreatic surface within the levee. The configurations of the assumed phreatic surfaces for the long term conditions analyzed are shown on Figure 5-1. The phreatic surfaces used in the landside slope, steady seepage, flood stage stability analysis, with a water level against the waterside slope corresponding to the design flood plane, are considered conservative, since only a very small portion of the water side of the levee embankment is likely to become saturated from a flood condition. This is discussed in more detail below.

The end of construction and long term conditions were analyzed for both static and pseudostatic (earthquake) loading conditions. Seismic loading conditions were approximated by using a pseudostatic coefficient of 0.15g for the earthquake condition analyses. An earthquake load equal to 15 percent of the total weight of soil in any given soil slice being analyzed was applied as a static horizontal force acting in the direction of instability at the center of the slice. Horizontal pseudostatic forces were not applied to water against the waterside slope, which was assigned zero shear strength.

Because of the highly impervious nature of the existing levee embankment fill, a saturation front would advance into the levee embankment section from the waterside slope only a very small distance during the anticipated time that water may remain at a given flood level. Because only a very small portion of the water side of the levee embankment is likely to become saturated, a full sudden drawdown condition as analyzed would not exist following a rapidly receding flood stage. Therefore, the sudden drawdown condition analyzed is considered quite conservative. Likewise, the steady seepage for full flood stage condition analyzed is considered conservative for the same reasons.

5.1.5 Method of Analysis

Conventional methods of limit equilibrium stability analyses to determine factors of safety against sliding using circular arc failure surfaces formed the basis of stability studies. For the approach taken of assigning a uniform lower bound strength to the foundation layer, which is conservative, the circular arc failure mode is critical, and the method of modeling potential critical failure surfaces used for the stability analyses is appropriate. The waterside and landside slopes for the various conditions previously discussed were computer-analyzed for circular arc failure modes using Bishop's modified method. This method incorporates, as basic input data, the geometry of the levee embankment slope and internal zones and the geometry of the levee foundation, unit weight and shear strength properties of the levee embankment and foundation materials, and the distribution of boundary and internal water forces. After a failure surface has been assumed, the soil mass above the sliding surface is divided into a series of vertical slices. Forces acting on each slice include the earth pressures on its sides, water pressures on its sides and bottom, effective earth pressures with associated friction acting on the assumed sliding surface, and cohesion along the sliding surface. Various trial failure surfaces are analyzed until a minimum factor of safety is obtained for the case being studied.

The Bishop's modified method is based on vertical equilibrium of the individual slices and overall moment equilibrium being satisfied. Side forces are included in the Bishop's analysis by using the simplifying assumption that they act only in a horizontal direction. Factors of safety are obtained by comparing the resisting and driving moment.

The Bishop's computational method was performed by computer analyses. The computer program PC STABL 5M, developed at the Purdue University was used to perform the stability analyses. The program performed automatic searches of different potential failure arcs to determine the most critical surface having the lowest factor of safety for the condition being analyzed. This program and method of analysis generally produce more conservative results than other more rigorous methods and available programs that would also be appropriate for this evaluation. The approach taken was to use more simplified methods initially, and if results exceeded required minimums, more rigorous methods would be unnecessary.

5.1.6 Results

The stability analyses results for the existing west levee for the various conditions studied are presented on Figures 5-4 through 5-7. The stability analyses results for the existing east levee for the various conditions studied are presented on Figures 5-8 through 5-11. Each of the cross sections on these figures show the various levee embankment and foundation materials and assigned properties, assumed water levels and phreatic surfaces, and the critical circles for the various conditions analyzed with the minimum factors of safety computed using Bishop's modified method indicated. In addition, the stability analyses results are summarized in Table 5-2 and compared to minimum requirements.

5.2 Settlement

A number of consolidation tests were performed on representative samples of fine-grained materials retrieved from the levee foundation and adjacent natural ground to be able to assess the potential for any future settlement of the levees. These materials, as opposed to coarser materials in the foundation or compacted levee fill materials, would be expected to have the greatest contribution to any ongoing settlement. By comparing preconsolidation pressures estimated from the consolidation tests to estimated existing overburden pressures associated with the samples tested, based on depth of the sample and unit weight of the overlying soil materials, it is apparent that the native materials beneath and adjacent to the levee at the locations tested are significantly overconsolidated. This assessment is including the imposed load from the existing levee fill. Reference is made to Appendix B for the individual consolidation test results.

As a result of the above observations from the findings of the laboratory investigation, detailed settlement analyses of the existing levees are not required. Significant future settlement of the existing levees is not expected under the current configuration and loading conditions of the existing levees, and under the existing site conditions. A check of recompression settlement of foundation materials under the load of the levee fill indicates settlement less than one inch (see Appendix D). Thus, the existing design freeboard above the flood stage should be maintained without addition of fill to the levee crest in the future, relative to settlement considerations.

5.3 Seepage

Based on the findings from field and laboratory investigations, seepage potential is not considered an adverse condition from either the standpoint of foundation underseepage or embankment seepage causing the development of excess hydrostatic pressures or piping. No adverse conditions that would be associated with seepage were observed during the site reconnaissance. Based on the subsurface field and laboratory investigations, the existing levee embankment and foundation materials are predominantly highly impervious in nature. Some sandy layers were encountered at depths in the foundation generally greater than 20 feet within the study area. However, they are mostly composed of clayey sand materials, that by nature are fairly impervious themselves, with some well-graded sand layers, and are at depths that make them of no consequence relative to potential adverse seepage.

5.4 Liquefaction Potential

Soil liquefaction usually occurs in clean, loose, saturated, uniformly graded silt and fine sand deposits. The phenomenon occurs when these soils lose their strength with cyclic shearing during an earthquake. Although some localized sandy materials were encountered at depth in the levee foundation, the site-specific field and laboratory investigations indicate that near-surface soils are predominantly of the type not susceptible to this phenomenon.

As discussed in Section 4.0, some layers of well-graded sand, generally at depths below 20 feet in the levee foundation, were encountered, typically along the central area of the west levee (DH-10 through DH-13). Given the well-graded nature and generally medium dense condition of these local deposits at the locations encountered and tested, the liquefaction potential of these isolated materials is considered low. Even if liquefaction were to occur in these materials, it is our opinion that the effects of any such liquefaction at depth would not seriously affect levee foundation support. This is due to the substantial thickness of near-surface nonliquefiable clay soils overlying and confining these localized coarser materials. Furthermore, the granular soils encountered at depth appear to exist in relatively thin layers, and it is believed that these layers are discontinuous.

5.5 Erosion Potential

Based on the findings from the field and laboratory investigations, erosion potential of the existing levees themselves is not considered an adverse condition. With the exception of some minor observed waterside slope erosion at the north end of the levees where the channel width is reduced and flood flows are assumed to have a higher velocity, no significant adverse conditions that would be associated with erosion of the levee section were observed during the site reconnaissance. Based on the subsurface field and laboratory investigations, the existing levee embankment and near-surface foundation materials are predominantly highly impervious clay soils. These materials by nature have greater erosional resistance than more granular, non-plastic materials.

As indicated in Table 2-1, however, one area noted during the site reconnaissance, associated with the low flow channel proximity to the levee, does possess some potential long term adverse erosion impacts to the levee. The low flow channel meanders close to the west levee between approximately TCR Station 41+00 to Station 46+00, is fairly deep, and has steep side slopes. Over time, during significant flows in the channel, it appears that progressive erosion of the steep low flow channel banks, particularly at bends in the channel that direct erosional forces into the bank below the levee, could at some point negatively impact the waterside levee slope and section of flood wall within this reach.

TABLE 5-1

SOIL PARAMETERS USED IN STABILITY ANALYSES

Condition	**Material Designation**[1]	**Unit Weight, pcf**	**Shear Strength**	
			Cohesion, psf	**Friction Angle, degrees**
End of Construction	1	130	1,000	0
	2	120	500	0
Sudden Drawdown	1	130	50	21
	2	120	100	12
Steady Seepage, Intermediate and Flood Stage	1	130	50	25
	2	120	100	20

Notes:

[1] 1 – Levee fill.
2 – Levee foundation.

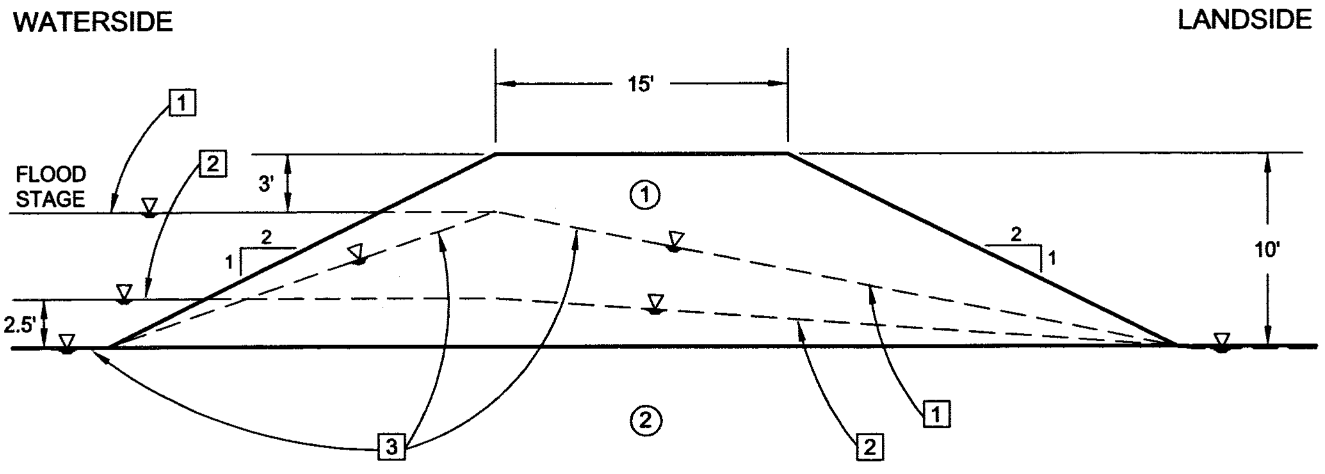
TABLE 5-2

STABILITY ANALYSES RESULTS[1]

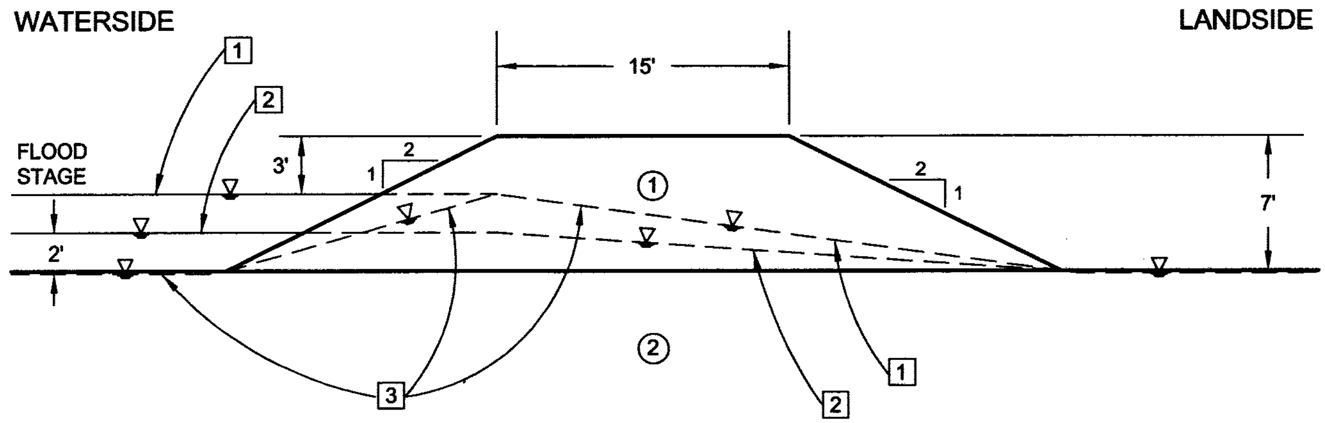
Condition	Slope	Required Minimum Safety Factor	Calculated Minimum Safety Factor	
			West Levee	**East Levee**
End of Construction - Static	Waterside	1.3	2.7	3.8
End of Construction - Static	Landside	1.3	2.7	3.8
Sudden Drawdown - Static	Waterside	1.0	1.0	1.2
Intermediate Stage[2] - Static	Waterside	1.4	1.5	1.7
Steady Seepage[3] - Static	Landside	1.4	1.4	1.7
End of Construction - Seismic[4]	Waterside	1.0	1.2	1.3
End of Construction - Seismic[4]	Landside	1.0	1.2	1.3
Intermediate Stage[2] - Seismic[4]	Waterside	1.0	1.0	1.2
Steady Seepage[3] - Seismic[4]	Landside	1.0	1.0	1.2

Notes:

[1] Refer to Figures 5-4 through 5-11 for graphical representation of results.
[2] Water depth of 2.5 feet against 10-foot high west levee section.
Water depth of 2.0 feet against 7-foot high east levee section.
[3] Full flood stage with 3-foot freeboard.
[4] Using pseudostatic coefficient of 0.15g.



WEST LEVEE



EAST LEVEE

EXPLANATION

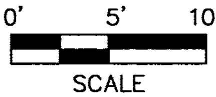
① LEVEE FILL MATERIAL

② LEVEE FOUNDATION MATERIAL

[1] ASSUMED WATER LEVEL / PHREATIC SURFACE - STEADY SEEPAGE CONDITION

[2] ASSUMED WATER LEVEL / PHREATIC SURFACE - INTERMEDIATE STAGE CONDITION

[3] ASSUMED PHREATIC SURFACE - SUDDEN DRAWDOWN CONDITION



EARTH TECH

FIGURE 5–1
STABILITY ANALYSIS
LEVEE CROSS SECTIONS

THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

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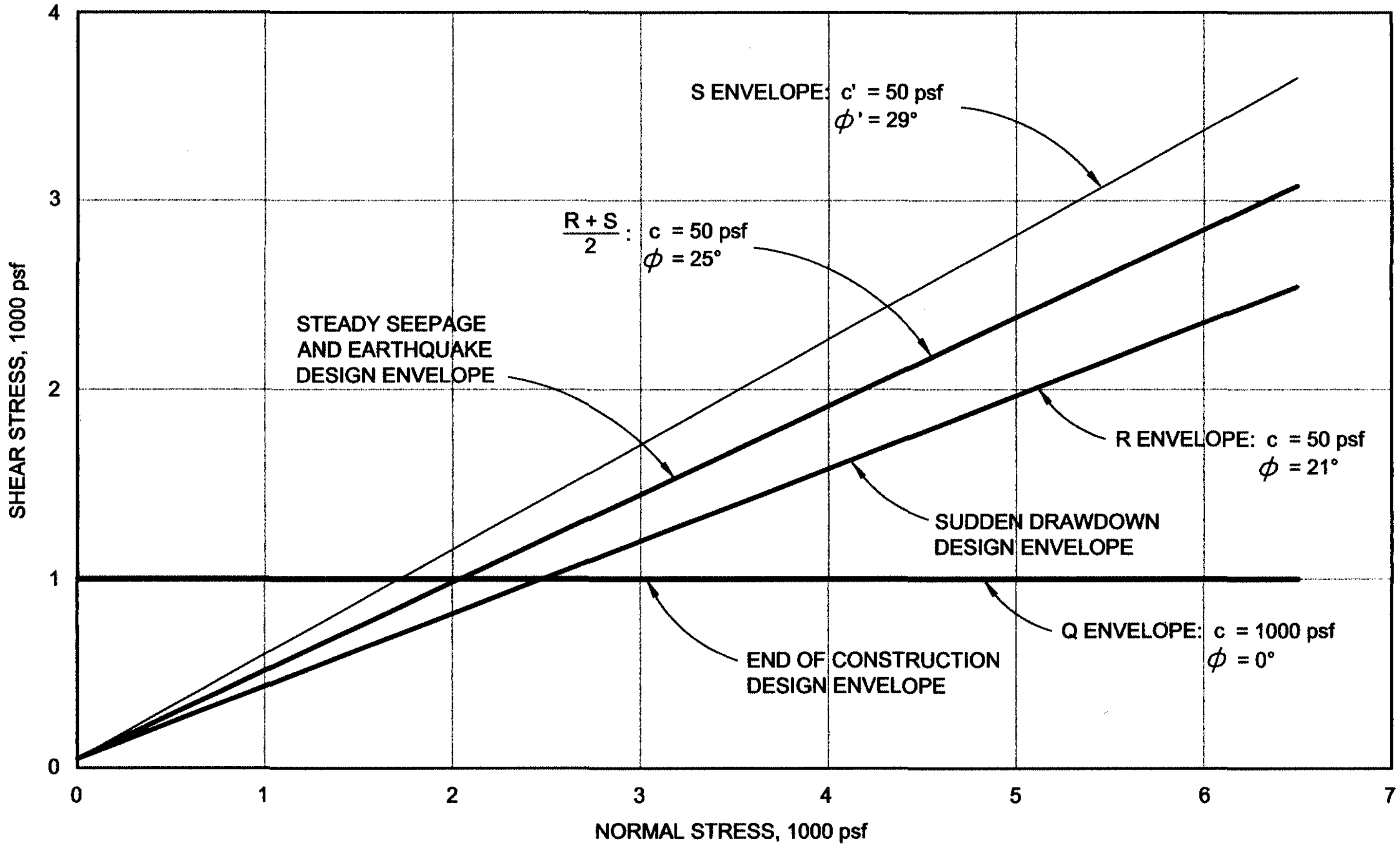
EXPLANATION

Q - UNCONSOLIDATED UNDRAINED CONDITION
R - CONSOLIDATED UNDRAINED CONDITION (TOTAL STRESS)
S - CONSOLIDATED DRAINED CONDITION (EFFECTIVE STRESS)



MATERIAL DESIGNATION 1: LEVEE FILL

EARTH TECH

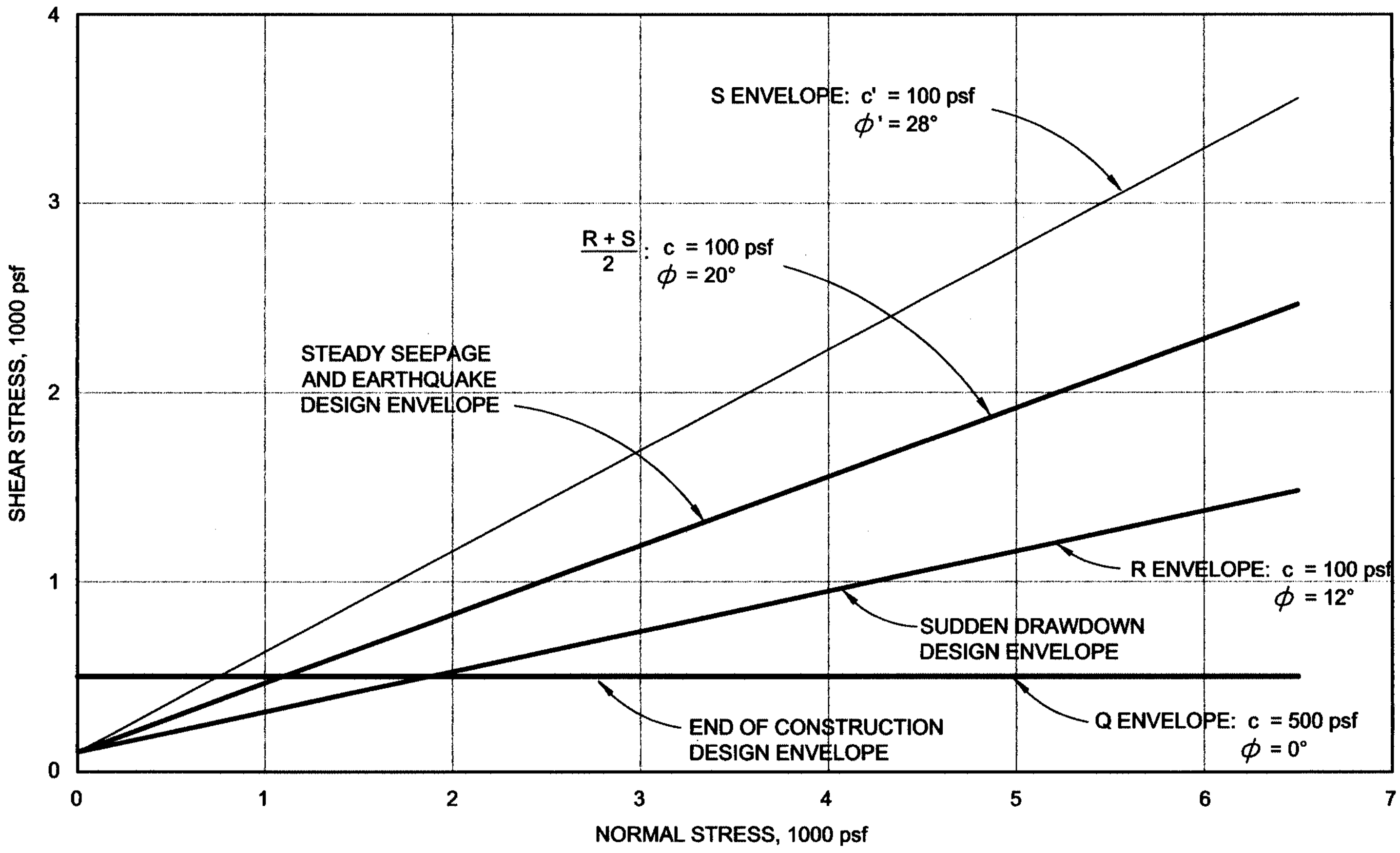
FIGURE 5-2

LEVEE FILL - STABILITY ANALYSIS
SHEAR STRENGTH PARAMETERS
THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA
APRIL 1999
32921

L:\WORK\CAD\PROJECTS\32921\FIG5-3.DWG 04/23/99

EXPLANATION

Q - UNCONSOLIDATED UNDRAINED CONDITION
R - CONSOLIDATED UNDRAINED CONDITION (TOTAL STRESS)
S - CONSOLIDATED DRAINED CONDITION (EFFECTIVE STRESS)



MATERIAL DESIGNATION 2: LEVEE FOUNDATION

EARTH TECH

FIGURE 5-3
LEVEE FOUNDATION - STABILITY ANAYSIS
SHEAR STRENGTH PARAMETERS
THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNA
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L:\WORK\CAD\PROJECTS\32921\FIG5-4.DWG 04/28/99

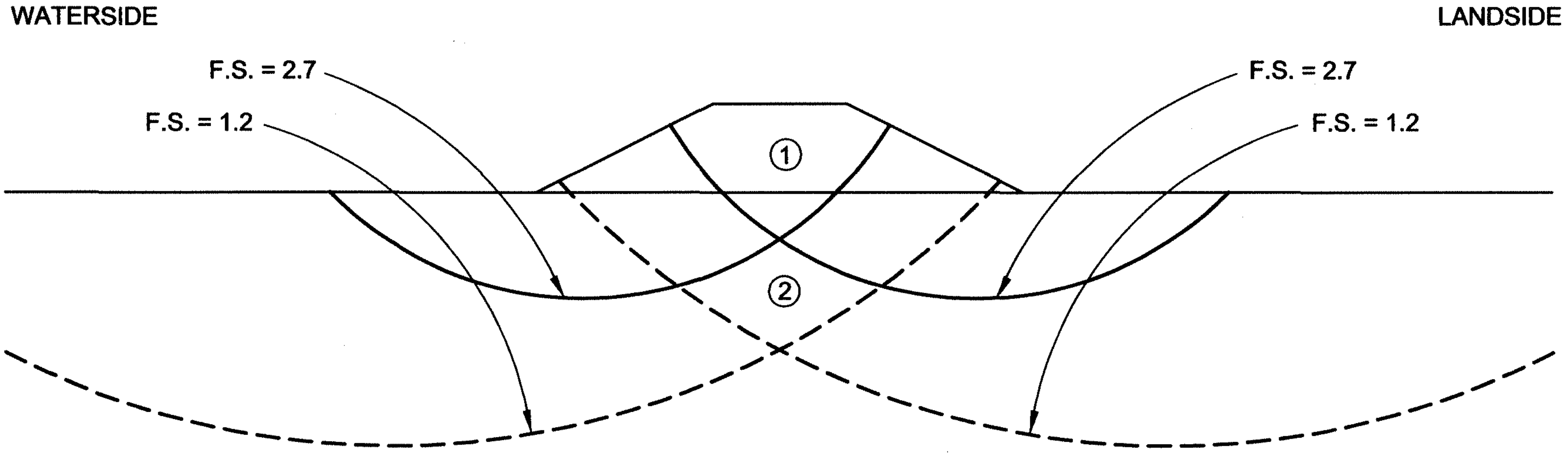
SOIL PARAMETERS USED IN STABILITY ANAYSES

MATERIAL DESIGNATION	DESCRIPTION	UNIT WEIGHT (pcf)	SHEAR STRENGTH	
			COHESION (psf)	FRICTION ANGLE (degrees)
①	LEVEE FILL	130	1000	0
②	LEVEE FOUNDATION	120	500	0

EXPLANATION

——— CRITICAL CIRCLE - STATIC

- - - - CRITICAL CIRCLE - PSEUDOSTATIC
(SEISMIC COEFFICIENT = 0.15 g)



0' 10' 20'
SCALE

EARTH TECH

FIGURE 5–4
STABILITY ANALYSIS RESULTS
WEST LEVEE – END OF CONSTRUCTION
THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA
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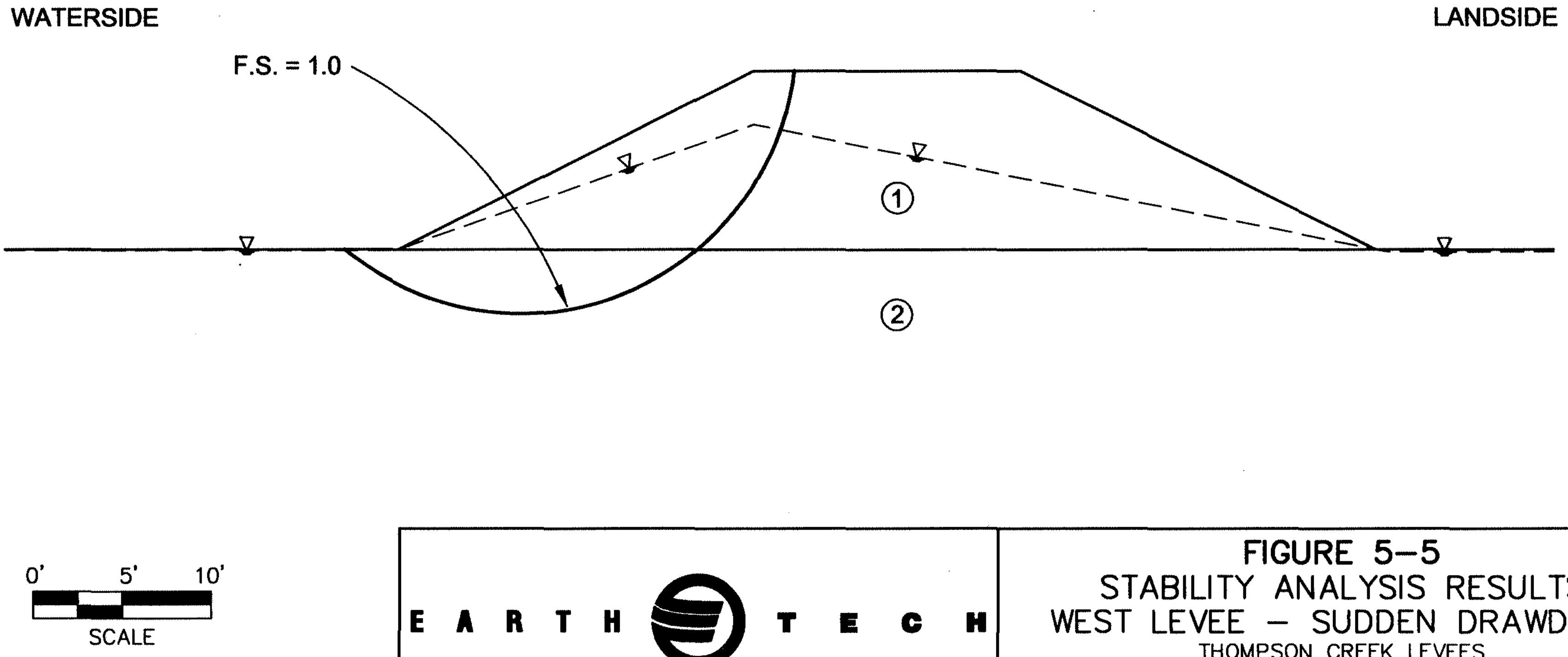
SOIL PARAMETERS USED IN STABILITY ANAYSES				
MATERIAL DESIGNATION	DESCRIPTION	UNIT WEIGHT (pcf)	SHEAR STRENGTH	
			COHESION (psf)	FRICTION ANGLE (degrees)
①	LEVEE FILL	130	50	21
②	LEVEE FOUNDATION	120	100	12

EXPLANATION

- - ▽ - - ASSUMED PHREATIC SURFACE

CRITICAL CIRCLE - STATIC



EARTH TECH

FIGURE 5-5
STABILITY ANALYSIS RESULTS
WEST LEVEE – SUDDEN DRAWDOWN

THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

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SOIL PARAMETERS USED IN STABILITY ANAYSES

MATERIAL DESIGNATION	DESCRIPTION	UNIT WEIGHT (pcf)	SHEAR STRENGTH	
			COHESION (psf)	FRICTION ANGLE (degrees)
①	LEVEE FILL	130	50	25
②	LEVEE FOUNDATION	120	100	20

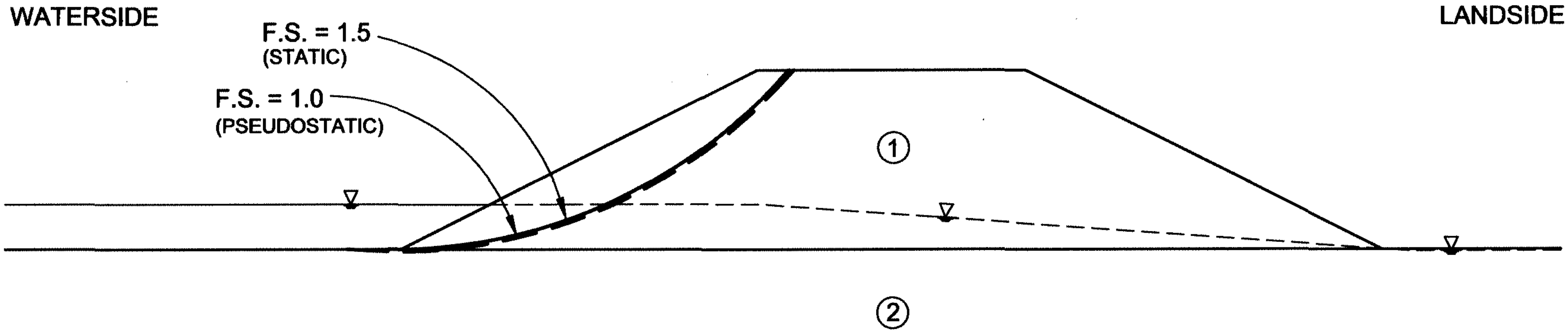
EXPLANATION

ASSUMED WATER LEVEL

ASSUMED PHREATIC SURFACE

CRITICAL CIRCLE - STATIC

CRITICAL CIRCLE - PSEUDOSTATIC
(SEISMIC COEFFICIENT = 0.15 g)



0' 5' 10'
SCALE

EARTH TECH

FIGURE 5–6
STABILITY ANALYSIS RESULTS
WEST LEVEE – INTERMEDIATE STAGE

THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

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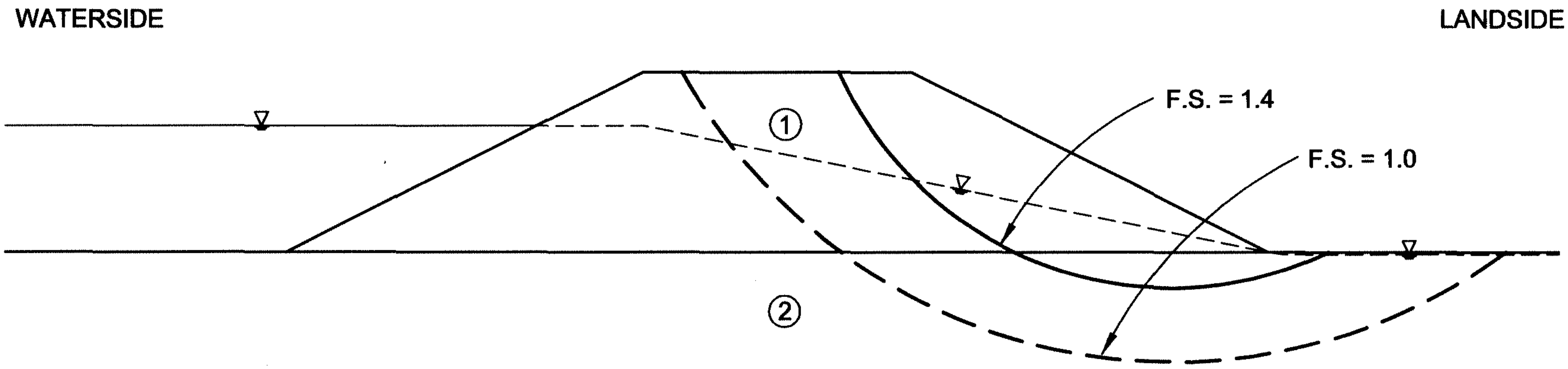
L:\WORK\CAD\PROJECTS\32921\FIG5-7.DWG 04/28/99

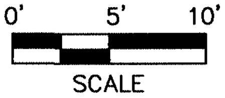
SOIL PARAMETERS USED IN STABILITY ANAYSES

MATERIAL DESIGNATION	DESCRIPTION	UNIT WEIGHT (pcf)	SHEAR STRENGTH	
			COHESION (psf)	FRICTION ANGLE (degrees)
①	LEVEE FILL	130	50	25
②	LEVEE FOUNDATION	120	100	20

EXPLANATION

- ASSUMED WATER LEVEL
- ASSUMED PHREATIC SURFACE
- CRITICAL CIRCLE - STATIC
- CRITICAL CIRCLE - PSEUDOSTATIC (SEISMIC COEFFICIENT = 0.15 g)





EARTH TECH

FIGURE 5-7
STABILITY ANALYSIS RESULTS WEST LEVEE - STEADY SEEPAGE

THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

APRIL 1999

32921

L:\WORK\CAD\PROJECTS\32921\FIG5-8.DWG 04/28/99

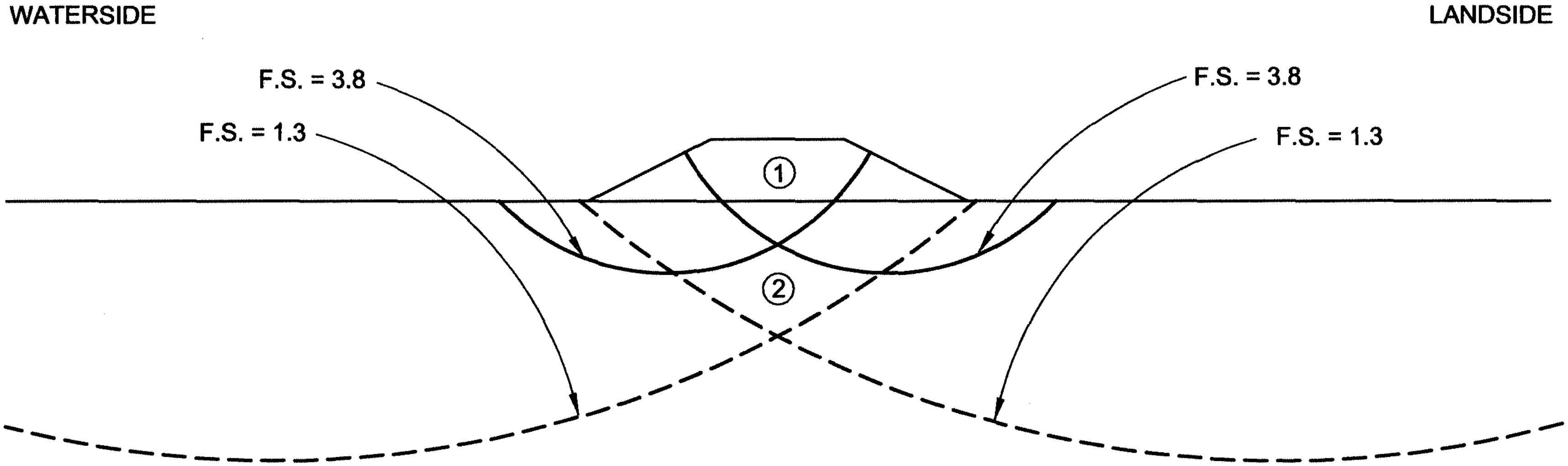
SOIL PARAMETERS USED IN STABILITY ANAYSES

MATERIAL DESIGNATION	DESCRIPTION	UNIT WEIGHT (pcf)	SHEAR STRENGTH	
			COHESION (psf)	FRICTION ANGLE (degrees)
①	LEVEE FILL	130	1000	0
②	LEVEE FOUNDATION	120	500	0

EXPLANATION

— CRITICAL CIRCLE - STATIC

- - - CRITICAL CIRCLE - PSEUDOSTATIC (SEISMIC COEFFICIENT = 0.15 g)



0' 10' 20'
SCALE

EARTH TECH

FIGURE 5-8

STABILITY ANALYSIS RESULTS
EAST LEVEE – END OF CONSTRUCTION

THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

APRIL 1999

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L:\WORK\CAD\PROJECTS\32921\FIG5-9.DWG 04/28/99

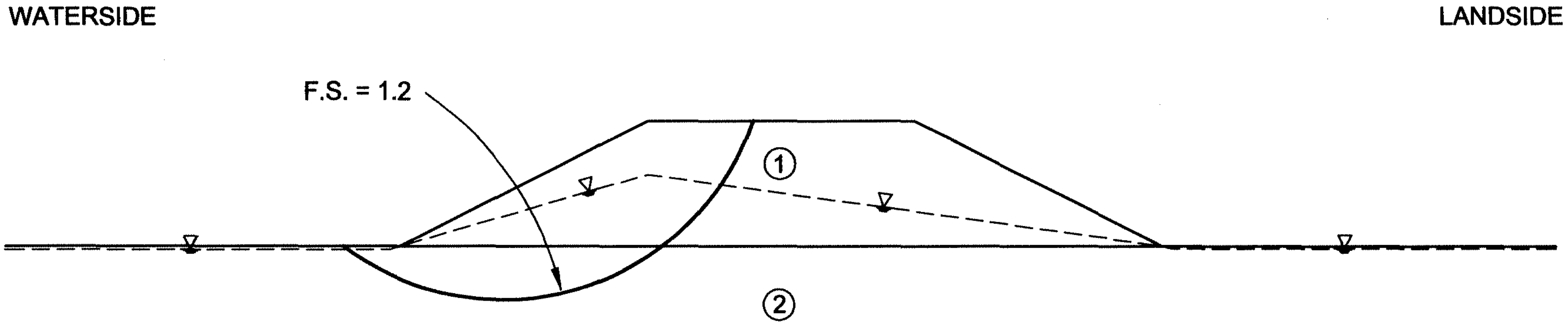
SOIL PARAMETERS USED IN STABILITY ANAYSES

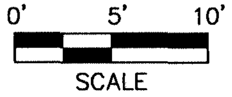
MATERIAL DESIGNATION	DESCRIPTION	UNIT WEIGHT (pcf)	SHEAR STRENGTH	
			COHESION (psf)	FRICTION ANGLE (degrees)
①	LEVEE FILL	130	50	21
②	LEVEE FOUNDATION	120	100	12

EXPLANATION

- - ▽ - - ASSUMED PHREATIC SURFACE

⁀ CRITICAL CIRCLE - STATIC





EARTH TECH

FIGURE 5-9
STABILITY ANALYSIS RESULTS
EAST LEVEE – SUDDEN DRAWDOWN

THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

APRIL 1999

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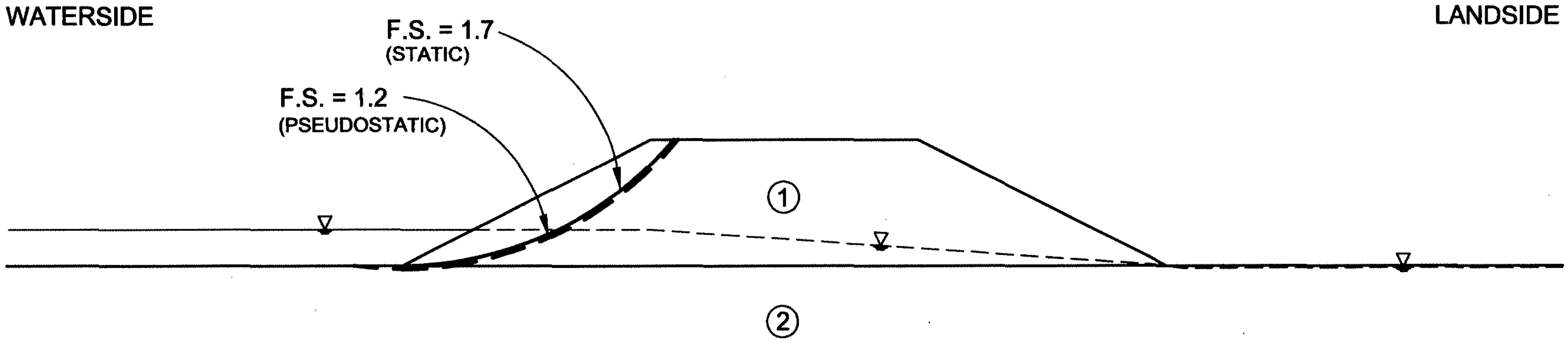
L:\WORK\CAD\PROJECTS\32921\FIG5-10.DWG 04/28/99

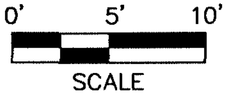
SOIL PARAMETERS USED IN STABILITY ANAYSES

MATERIAL DESIGNATION	DESCRIPTION	UNIT WEIGHT (pcf)	SHEAR STRENGTH	
			COHESION (psf)	FRICTION ANGLE (degrees)
①	LEVEE FILL	130	50	25
②	LEVEE FOUNDATION	120	100	20

EXPLANATION

—▽—	ASSUMED WATER LEVEL
- -▽- -	ASSUMED PHREATIC SURFACE
——	CRITICAL CIRCLE - STATIC
— —	CRITICAL CIRCLE - PSEUDOSTATIC (SEISMIC COEFFICIENT = 0.15 g)





EARTH TECH

FIGURE 5–10
STABILITY ANALYSIS RESULTS
EAST LEVEE – INTERMEDIATE STAGE
THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

APRIL 1999

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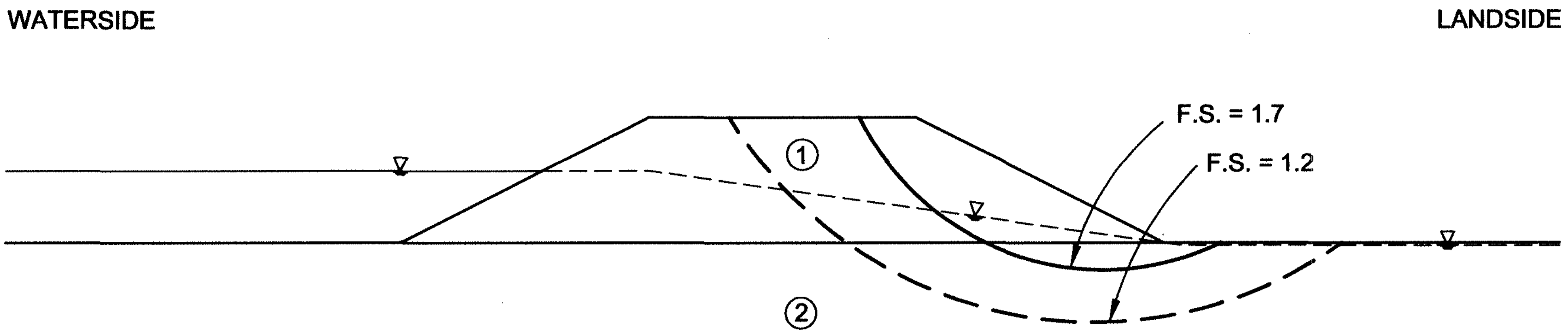
L:\WORK\CAD\PROJECTS\32921\FIG5-11.DWG 04/23/99

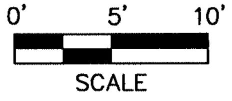
SOIL PARAMETERS USED IN STABILITY ANAYSES

MATERIAL DESIGNATION	DESCRIPTION	UNIT WEIGHT (pcf)	SHEAR STRENGTH	
			COHESION (psf)	FRICTION ANGLE (degrees)
①	LEVEE FILL	130	50	25
②	LEVEE FOUNDATION	120	100	20

EXPLANATION

—▽—	ASSUMED WATER LEVEL
- -▽- -	ASSUMED PHREATIC SURFACE
———	CRITICAL CIRCLE - STATIC
- - -	CRITICAL CIRCLE - PSEUDOSTATIC (SEISMIC COEFFICIENT = 0.15 g)





EARTH TECH

FIGURE 5–11

STABILITY ANALYSIS RESULTS
EAST LEVEE – STEADY SEEPAGE

THOMPSON CREEK LEVEES
SAN JOSE, CALIFORNIA

APRIL 1999

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6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the field and laboratory investigations conducted for this study and the associated engineering evaluations, the following major conclusions, and recommendations where applicable, can be made regarding the existing condition of the Thompson Creek Levees and their anticipated future performance:

- The existing levee embankments are comprised primarily of sandy clay soils of low to moderate plasticity. Some localized moderate to highly plastic fill materials, which are prone to desiccation cracking during dry periods, exist, mostly toward the southern end of the levees.

- Foundation materials beneath the existing levees are primarily sandy clay soils of moderate plasticity with localized zones of sandy materials at depth.

- The existing levee fill materials appear well-compacted.

- Stability of the existing levee system is found adequate for all required conditions. The results indicate a number of marginal factors of safety relative to required minimums. However, considering the many conservatisms of the analysis, including use of a combination of the most conservative strength data with the most conservative cross section geometry, simplification of strength parameters for conditions of analysis on the conservative side, unliklihood of the full critical development of internal seepage forces associated with the flood event having water against the levee for a limited time, and use of a more conservative method of analysis than more rigorous methods, the apparent marginal cases in reality exceed required minimums.

- Significant future settlement of the existing levees under present conditions is not expected. Settlement potential is not considered an adverse condition to maintenance of required freeboard.

- The existing levees exhibit a low potential for seepage-related adverse conditions, considering the predominant fine-grained nature of fill and foundation materials.

- Liquefaction potential at the project site is considered low. Only localized confined zones of sandy soils were encountered at depth in the foundation at some locations along the levees and would not be expected to translate significant detrimental effects to the levee section or its foundation in a seismic event.

- There is a low erosion potential of the predominantly fine-grained fill and near-surface foundation soils. However, the steep-sided meandering low flow channel locally adjacent to the west levee appears to have some long term erosion potential impact to the levee, flood wall, and adjacent property. Local mitigation, by straightening the channel away from the levee, or installation of erosion protection measures such as sacked concrete or gabion slope protection, is recommended as a long-term maintenance measure.

Considering the various geotechnical-related conditions analyzed and evaluated as part of this investigation, it is concluded that the Thompson Creek Levees, within the limits of this project, are in satisfactory condition, particularly relative to geotechnical design criteria associated with FEMA certification guidelines. Furthermore, it appears that the levees will perform adequately, from a geotechnical standpoint, under various required design conditions, including flood-related and seismic conditions. The only condition noted with any significant potential adverse geotechnical-related condition is that noted above and is considered to be a long-term maintenance issue.

7.0 REFERENCES

Achilleos, Eftychios, 1988. *Informational Report – User Guide for PC STABL 5M,* Purdue University, December 15, 1988.

Dames & Moore, 1999. *Report – Laboratory Testing for Thompson Creek Flood Control Levees – San Jose, California,* prepared by Dames & Moore, January 19, 1999.

Santa Clara Valley Water District, 1990. *Specifications and Contract Documents for Thompson Creek Levee Construction from Quimby Road to Westgrove Lane, Project No. 4047*, January 1990.

U. S. Army Corps of Engineers, 1978. *Design and Construction of Levees, Engineering Manual EM 1110-2-1913*, March 31, 1978.

APPENDIX A

BORING LOGS

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-1
WELL NO.: NA

PAGE: 1 OF 2

PROJECT NAME: Thompson Creek Levee	**PROJECT NO.:** 32921.10100
CLIENT: Santa Clara Valley Water District	**DRILLING CONTRACTOR:** Spectrum Drilling
DRILLING EQUIPMENT: CME 55	**DRILLER:**
SAMPLING METHOD: SPT; 2 1/2" split spoon; Shelby Tube	**TOTAL DEPTH:** 29.50' BGS
START DATE: 10/7/98	**COMPLETION DATE:** 10/7/98
LOGGED BY: A.S. Buangan	**APPROVED BY:** S. H. Kline
LOCATION: STA 15+50 TCL	**SURFACE ELEVATION:**

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
					▨	LEVEE FILL 4" Road base. 0.3'-6.3' LEAN CLAY WITH SAND (CL): dark brown to brownish black; about 10% coarse sand and fine gravel; stiff; dry; appears tight and compacted.		Drilled with 6" hollow stem auger (HA).
	1.4/1.5	16 8 13	L-1A L-1B		▨			2.0'-3.5' Drove 2 1/2" drive sampler with 140 lb. hammer and 30" free fall (CM).
5	1.4/1.5	4 6 9	B-1		▨			5.0'-6.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT).
					▨	ALLUVIUM 6.3'-18.0' LEAN CLAY WITH SAND (CL): moderate yellowish brown; ~5% coarse sand; ~5% fine gravel; medium to stiff; slightly damp; original soil contact at 6.3' bgs shows brown organics.		
	1.5/2.0	100 PSI	S-1		▨			8.0'-10.0' Pushed 3-inch diameter Shelby tube (P).
10					▨			
	1.3/1.5	4 5 9	B-2		▨	Grades to mottled yellowish brown and brownish gray; medium plasticity; stiff; slightly damp.		13.0'-14.5' SPT.
15					▨			Easy drilling
					▨		▽	
	1.9/2.0		S-2		▨	18.0'-23.0' FAT CLAY WITH SAND (CH): mottled yellowish brown and dark yellowish orange; ~10% coarse sand to fine gravel; stiff; damp to moist.		18.0'-20.0' P.
20					▨			Tip of sample wet at 20'.
	0.2/1.5	2 3 2	B-3		▨	23.0'-25.0' SILTY SAND TO CLAYEY SAND (SC-SM): moderate yellowish brown; fine to very fine; loose; saturated.		Water level in auger after drilling to 25' is at 23' bgs. 23.0'-24.5' SPT; poor recovery;

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-1
WELL NO.: NA

PROJECT NAME: Thompson Creek Levee **PROJECT NO.:** 32921.10100 **PAGE:** 2 **OF** 2

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
	1.3/1.5	4 7 8	B-4	▽	▨	25.0'-29.5' CLAYEY SAND WITH GRAVEL (SC): moderate yellowish brown; 5-10% coarse sand; ~5% fine gravel; subangular to subrounded; moderately plastic fines; saturated; medium dense.		sample apparently slipped out of spoon; probably soft silty to clayey sand.
30						TOTAL DEPTH 29.5'		Water level after drilling at 17.0'. Backfilled hole with cement grout.
35								
40								
45								
50								
55								

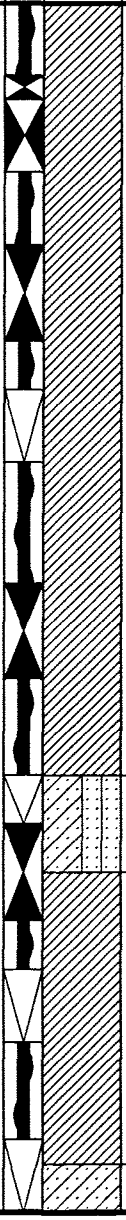
EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-2
WELL NO.: NA

PAGE: 1 OF 2

PROJECT NAME: Thompson Creek Levee
PROJECT NO.: 32921.10100
CLIENT: Santa Clara Valley Water District
DRILLING CONTRACTOR: Spectrum Drilling
DRILLING EQUIPMENT: CME 55
DRILLER:
SAMPLING METHOD: SPT; 2 1/2" split spoon; Shelby Tube
TOTAL DEPTH: 25.00' BGS
START DATE: 10/8/98
COMPLETION DATE: 10/8/98
LOGGED BY: A.S. Buangan
APPROVED BY: S. H. Kline
LOCATION: STA 15+50 TCL, 46' east of DH-1
SURFACE ELEVATION:



DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						ALLUVIUM 0'-4.0' LEAN CLAY WITH SAND (CL): mottled moderate brown and moderate yellowish brown; 15-20% coarse sand and fine gravel; subangular to subrounded; stiff; slightly damp.		Drilled with 6" hollow stem auger (HA). Plowed surface
	0.4/0.5 1.5/1.5	13 15 18	B-1 L-1A L-1B					1.5'-2.0' Pushed 3-inch diameter Shelby tube (P). Refusal at 2'; bent tip of tube. 2.0'-3.5' Drove 2 1/2" drive sampler with 140 lb. hammer and 30" free fall (CM).
5	1.4/2.0		S-1			4.0'-16.0' LEAN CLAY WITH SAND (CL): mottled yellowish brown and moderate brown; fine to coarse sand; traces of fine gravel; stiff; damp.		5.0'-7.0' P.
	1.4/1.5	3 5 8	B-2					8.0'-9.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT).
10								
	2.0/2.0		S-2					12.0'-14.0' P.
						Water noted in sample at 14'; material is saturated below 14'	∇	Tip of shelby wet at 14'.
15								
	0/1.0 1.5/2.0	0 soft	S-3			16.0'-18.0' CLAYEY OR SILTY SAND (SC-SM): moderate yellowish brown; fine to medium sand; loose; saturated.		16.0'-17.0' SPT fell 12" with hammer weight; no recovery; probably slipped out of spoon. 17.0'-19.0' P; soft; very little applied pressure.
						18.0'-24.0' LEAN CLAY WITH SAND (CL): mottled moderate brown and moderate yellowish brown; fine to medium sand; traces of fine gravel; stiff; damp.		
20	1.5/1.5	4 6 11	B-3					20.0'-21.5' SPT.
	1.5/1.5	3 8	B-4			24.0'-25.0' CLAYEY SAND WITH GRAVEL (SC):		23.5'-25.0' SPT.

E A R T H   T E C H

TEST BORING LOG

BOREHOLE NO.: DH-2
WELL NO.: NA

PROJECT NAME: Thompson Creek Levee **PROJECT NO.:** 32921.10100 **PAGE:** 2 **OF** 2

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
		11				moderate yellowish brown; saturated; medium dense.		Backfilled hole with cement grout.
						TOTAL DEPTH 25.0'		
30								
35								
40								
45								
50								
55								

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-3
WELL NO.: NA

PAGE: 1 OF 2

PROJECT NAME: Thompson Creek Levee	**PROJECT NO.:** 32921.10100
CLIENT: Santa Clara Valley Water District	**DRILLING CONTRACTOR:** Spectrum Drilling
DRILLING EQUIPMENT: CME 55	**DRILLER:**
SAMPLING METHOD: SPT; 2 1/2" split spoon; Shelby Tube	**TOTAL DEPTH:** 31.50' BGS
START DATE: 10/7/98	**COMPLETION DATE:** 10/7/98
LOGGED BY: A.S. Buangan	**APPROVED BY:** S. H. Kline
LOCATION: STA 24+00 TCL	**SURFACE ELEVATION:**

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						LEVEE FILL 4" Road base; crushed rock. 0.3'-7.0' LEAN CLAY WITH SAND (CL): mottled moderate yellowish brown, moderate brown and brownish gray; fine to coarse sand; traces of gravel; stiff; dry to slightly damp.		Drilled with 6" hollow stem auger (HA).
	1.2/1.5	10 9 9	B-1					2.0'-3.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT). Easy drilling
5								
	1.5/1.5	10 11 12	L-1A L-1B					6.0'-7.5' Drove 2 1/2" drive sampler with 140 lb. hammer and 30" free fall (CM).
						ALLUVIUM 7.0'-20.0' LEAN CLAY WITH SAND (CL): moderate yellowish brown; ~5% fine gravel; fine to coarse sand; stiff; slightly damp to damp.		
10	1.8/2.0	500 PSI	S-1					10.0'-12.0' Pushed 3-inch diameter Shelby tube (P).
15	1.5/1.5	2 4 7	B-2					15.0'-16.5' SPT.
20	1.5/1.5	3 7 9	L-2A L-2B			20.0'-31.5' FAT CLAY WITH SAND (CH): moderate yellowish brown; medium to stiff; moist to saturated.		∇ 20.0'-21.5' CM. Sample wet at tip; water level at 20.4' bgs.

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-3

WELL NO.: NA

PROJECT NAME: Thompson Creek Levee **PROJECT NO.:** 32921.10100

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
	1.5/1.5	2 4 5	B-3		▨	Mottled yellowish orange and brownish gray; medium to stiff; moist.		25.0'-26.5' SPT.
30	1.5/1.5	4 6 6	B-4		▨			30.0'-31.5' SPT.
						TOTAL DEPTH 31.5'		Backfilled hole with cement grout.
35								
40								
45								
50								
55								

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-4
WELL NO.: NA

PAGE: 1 OF 2

PROJECT NAME: Thompson Creek Levee	**PROJECT NO.:** 32921.10100
CLIENT: Santa Clara Valley Water District	**DRILLING CONTRACTOR:** Spectrum Drilling
DRILLING EQUIPMENT: CME 55	**DRILLER:**
SAMPLING METHOD: SPT; Shelby Tube	**TOTAL DEPTH:** 24.50' BGS
START DATE: 10/8/98	**COMPLETION DATE:** 10/8/98
LOGGED BY: A.S. Buangan	**APPROVED BY:** S. H. Kline
LOCATION: STA 29+80 TCL, 36' east of crest center	**SURFACE ELEVATION:**

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						ALLUVIUM 0'-6.0' LEAN CLAY WITH SAND (CL): mottled moderate brown and moderate yellowish brown; fine to coarse sand; ~10% coarse sand and fine gravel; medium to stiff; dry to slightly damp.		Drilled with 6" hollow stem auger (HA).
	0.6/1.5	3 3 3	B-1					2.0'-3.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT).
5								
	1.4/2.0	500-1500 PSI	S-1			6.0'-11.0' LEAN CLAY WITH GRAVEL (CL): mottled moderate yellowish brown and moderate reddish brown; ~20% fine gravel; subangular; very stiff; damp.		6.0'-8.0' Pushed 3-inch diameter Shelby tube (P).
10								
	1.3/1.5	3 3 4	B-2			11.0'-23.0' LEAN CLAY WITH SAND (CL): moderate yellowish brown; traces of fine gravel; medium consistency; damp.		11.0'-12.5' SPT.
15								
	1.9/2.0	500 PSI	S-2					16.0'-18.0' P.
						Saturated below 18'.	▽	Tip of sample wet at 18'.
	2.0/2.0	500 PSI	S-3					19.0'-21.0' P.
20								
	0/1.5	3 3 4				23.0'-24.5' CLAYEY SAND TO SILTY SAND (SC-SM): moderate yellowish brown; fine to very fine sand; loose; saturated.		23.0'-24.5' SPT; no recovery; apparently slipped out; probably wet, clayey/silty sand.

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-4
WELL NO.: NA

PROJECT NAME: Thompson Creek Levee **PROJECT NO.:** 32921.10100 **PAGE:** 2 **OF** 2

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						TOTAL DEPTH 24.5'		Backfilled hole with cement grout.
30								
35								
40								
45								
50								
55								

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EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-5
WELL NO.: NA

PAGE: 1 OF 2

PROJECT NAME: Thompson Creek Levee	PROJECT NO.: 32921.10100
CLIENT: Santa Clara Valley Water District	DRILLING CONTRACTOR: Spectrum Drilling
DRILLING EQUIPMENT: CME 55	DRILLER:
SAMPLING METHOD: SPT; 2 1/2" split spoon; Shelby Tube	TOTAL DEPTH: 27.50' BGS
START DATE: 10/8/98	COMPLETION DATE: 10/8/98
LOGGED BY: A.S. Buangan	APPROVED BY: S. H. Kline
LOCATION: STA 34+90 TCL, 41.5' west of DH-6	SURFACE ELEVATION:

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						ALLUVIUM 0'-19.0' LEAN CLAY WITH SAND (CL): moderate yellowish brown; 10-15% coarse sand to fine gravel; subangular to subrounded; stiff; dry to damp.		Drilled with 6" hollow stem auger (HA).
	1.9/2.0	700 PSI	S-1					3.0'-5.0' Pushed 3-inch diameter Shelby tube (P).
5								
	1.0/1.5	4 7 9	B-1			Very stiff; slightly damp.		7.0'-8.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT). Slow, stiff drilling.
10								
	1.5/1.5	6 11 17	L-1A L-1B					11.0'-12.5' Drove 2 1/2" drive sampler with 140 lb. hammer and 30" free fall (CM). Slow, stiff drilling.
15	1.5/1.5	2 4 8	B-2					15.0'-16.5' SPT.
20	1.5/1.5	4 5 8	L-2A L-2B			19.0'-26.5' LEAN CLAY WITH SAND (CL): moderate yellowish brown; fine to medium sand; traces of coarse sand and fine gravel; stiff; moist to saturated.		▽ 19.0'-20.5' CM. Sample wet; water at 19.8' bgs.
	1.5/2.0	500 PSI	S-2					23.0'-25.0' P.

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-5

WELL NO.: NA

PROJECT NAME: Thompson Creek Levee **PROJECT NO.:** 32921.10100 **PAGE:** 2 OF 2

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
	1.3/1.5	6 6 8	B-3			26.5'-27.5' CLAYEY SAND WITH GRAVEL (SC): moderate yellowish brown; 15-20% coarse sand to fine gravel; saturated; medium dense. TOTAL DEPTH 27.5'		26.0'-27.5' SPT. Backfilled hole with cement grout.
30								
35								
40								
45								
50								
55								

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-6
WELL NO.: NA

PAGE: 1 OF 2

PROJECT NAME: Thompson Creek Levee	**PROJECT NO.:** 32921.10100
CLIENT: Santa Clara Valley Water District	**DRILLING CONTRACTOR:** Spectrum Drilling
DRILLING EQUIPMENT: CME 55	**DRILLER:**
SAMPLING METHOD: SPT; 2 1/2" split spoon; Shelby Tube	**TOTAL DEPTH:** 36.50' BGS
START DATE: 10/7/98	**COMPLETION DATE:** 10/7/98
LOGGED BY: A.S. Buangan	**APPROVED BY:** S. H. Kline
LOCATION: STA 34+90 TCL	**SURFACE ELEVATION:**

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						LEVEE FILL 4" Road base; crushed rock.		Drilled with 6" hollow stem auger (HA).
	1.2/1.5	3 6 8	B-1			0.3'-7.0' LEAN CLAY WITH SAND (CL): mottled moderate brown to brownish gray and gray; fine to coarse sand; stiff to very stiff; dry.		1.0'-2.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT).
5	1.3/1.5	6 13 20	L-1A L-1B			Grades to brownish black; some fine subangular gravel; stiff; tight; dry.		5.0'-6.5' Drove 2 1/2" drive sampler with 140 lb. hammer and 30" free fall (CM).
	1.0/1.5	4 4 4	B-2			ALLUVIUM 7.0'-25.0' LEAN CLAY WITH SAND (CL): moderate yellowish brown; fine to medium sand; medium to stiff; slightly damp.		7.0'-8.5' SPT.
10	2.0/2.0	100 PSI	S-1					10.0'-12.0' Pushed 3-inch diameter Shelby tube (P). Slow drilling.
15	1.2/1.5	3 5 10	B-3			As above; stiff; damp.		15.0'-16.5' SPT. Took 8 minutes to auger from 15' to 20'; slow.
20	1.3/1.5	2 3 7	B-4			As above; stiff; damp.		▽ 20.0'-21.5' SPT. Slow, stiff drilling; tight hole; took 8 minutes.

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-6

WELL NO.: NA

PROJECT NAME: Thompson Creek Levee **PROJECT NO.:** 32921.10100 **PAGE:** 2 **OF** 2

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
	1.3/1.5	4 5 7	B-5			25.0'-30.0' CLAYEY SAND WITH GRAVEL (SC): moderate yellowish brown; fine to coarse, subangular to subrounded sand; ~5% fine gravel; moderately plastic fines; saturated; stiff.		25.0'-26.5' SPT.
30	1.5/1.5	2 2 2	B-6			30.0'-31.0' SILTY SAND (SM): light brown; fine to very fine sand; loose; saturated.		30.0'-31.5' SPT.
						31.0'-36.5' LEAN CLAY WITH SAND (CL): mottled dark yellowish orange and brownish gray; medium to stiff; wet.		Easy drilling.
35	1.5/1.5	4 4 5	B-7					35.0'-36.5' SPT.
						TOTAL DEPTH 36.5'		Water level after drilling at 20.8'. Backfilled hole with cement grout.
40								
45								
50								
55								

E A R T H T E C H

TEST BORING LOG

BOREHOLE NO.: DH-7
WELL NO.: NA

PAGE: 1 OF 2

PROJECT NAME: Thompson Creek Levee	**PROJECT NO.:** 32921.10100
CLIENT: Santa Clara Valley Water District	**DRILLING CONTRACTOR:** Spectrum Drilling
DRILLING EQUIPMENT: CME 55	**DRILLER:**
SAMPLING METHOD: SPT; 2 1/2" split spoon	**TOTAL DEPTH:** 31.50' BGS
START DATE: 10/7/98	**COMPLETION DATE:** 10/7/98
LOGGED BY: A.S. Buangan	**APPROVED BY:** S. H. Kline
LOCATION: STA 44+00 TCL	**SURFACE ELEVATION:**

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						LEVEE FILL 0'-5.0' LEAN CLAY WITH SAND (CL): mottled brown to dark brown; ~15% fine to coarse sand; medium plasticity; very stiff; dry.		Drilled with 6" hollow stem auger (HA). 1.0'-2.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT).
	1.2/1.5	7 12 17	B-1					
	1.0/1.5	6 9 9	B-2					4.0'-5.5' SPT.
5						ALLUVIUM 5.0'-18.0' FAT CLAY WITH SAND (CH): moderate brown; ~10% fine to coarse sand; traces of gravel; medium to high plasticity; stiff; dry to damp.		Easy augering.
	1.5/1.5	6 8 11	L-1A L-1B					8.0'-9.5' Drove 2 1/2" drive sampler with 140 lb. hammer and 30" free fall (CM).
10								Slow, stiff drilling; applied hydraulic pressure.
	1.5/1.5	5 8 14	B-3					13.0'-14.5' SPT.
15								Slow, stiff drilling; applied hydraulic pressure.
	1.5/1.5	6 8 11	L-2A L-2B			18.0'-24.0' FAT CLAY WITH SAND (CH): moderate yellowish brown; ~10% coarse sand; ~5% fine gravel; subangular to subrounded; compact; stiff; damp.		18.0'-19.5' CM.
20								Slow, stiff drilling; applied hydraulic pressure.
								▽
						24.0'-31.5' WELL GRADED SAND WITH SILT AND		

E A R T H T E C H

TEST BORING LOG

BOREHOLE NO.: DH-7
WELL NO.: NA

PROJECT NAME: Thompson Creek Levee **PROJECT NO.:** 32921.10100 **PAGE:** 2 OF 2

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
	1.5/1.5	15 25 29	L-3 B-4			GRAVEL (SW): grayish brown; fine to coarse sand; ~5% fine, subangular gravel; ~10% slightly plastic to non-plastic fines; very dense; saturated.		25.0'-26.5' CM.
								Slow, stiff drilling; softer at 29'..
30	1.3/1.5	4 21 36	B-5					30.0'-31.5' SPT.
						TOTAL DEPTH 31.5'		Water level after drilling at 24.0'. Backfilled hole with cement grout.
35								
40								
45								
50								
55								

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-8
WELL NO.: NA

PAGE: 1 OF 2

PROJECT NAME: Thompson Creek Levee
PROJECT NO.: 32921.10100
CLIENT: Santa Clara Valley Water District
DRILLING CONTRACTOR: Spectrum Drilling
DRILLING EQUIPMENT: CME 55
DRILLER:
SAMPLING METHOD: SPT; 2 1/2" split spoon; Shelby Tube
TOTAL DEPTH: 30.50' BGS
START DATE: 10/7/98
COMPLETION DATE: 10/7/98
LOGGED BY: A.S. Buangan
APPROVED BY: S. H. Kline
LOCATION: STA 51+10 TCL
SURFACE ELEVATION:

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						LEVEE FILL 0'-5.0' FAT CLAY (CH): slightly sandy; moderate brown to dark brown; medium to high plasticity; desiccation cracks on surface; very stiff; dry; appears compacted and tight.		Drilled with 6" hollow stem auger (HA).
	1.5/1.5	54 31 50	L-1A L-1B B-1					1.0'-2.5' Drove 2 1/2" drive sampler with 140 lb. hammer and 30" free fall (CM).
5	0.4/1.5	5 6 6	B-2			ALLUVIUM 5.0'-15.0' LEAN CLAY WITH SAND (CL): mottled moderate reddish brown and moderate yellowish brown; ~10-15% coarse sand to fine gravel; very stiff; dry to slightly damp.		5.0'-6.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT).
	0.6/1.5	5 8 8	B-3					7.0'-8.5' SPT.
10	1.5/1.5	10 18 25	L-2A L-2B					10.0'-11.5' CM.
								Slow, stiff drilling; applied hydraulic down pressure.
15	0.8/1.5	6 9 10	B-4			15.0'-19.0' LEAN CLAY WITH SAND (CL): moderate yellowish brown; ~15-20% coarse sand to fine gravel; stiff to very stiff; slightly damp.		15.0'-16.5' SPT.
								Slow drilling in stiff soils; applied hydraulic pressure.
						19.0'-23.0' CLAYEY SAND WITH GRAVEL (SC): moderate reddish brown; fine to coarse sand; ~10-15% clay/silt fines; ~10% fine gravel; subangular to subrounded; very dense; moist.		Softer; easy drilling at 19'.
20	1.5/1.5	8 16 26	L-3A L-3B					20.0'-21.5' CM. Slow drilling 20'-23'.
								∇
						23.0'-30.5' CLAYEY SAND TO SANDY CLAY (SC/CL): moderate yellowish brown; fine to medium sand; moderately plastic fines; saturated; medium dense.		Soft at 23'.

E A R T H T E C H

TEST BORING LOG

BOREHOLE NO.: DH-8

WELL NO.: NA

PROJECT NAME: Thompson Creek Levee **PROJECT NO.:** 32921.10100 **PAGE:** 2 **OF** 2

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
	2.5/2.5		S-1					25.0'-27.5' Pushed 3" diameter shelby tube (P); easy pushing.
	1.5/1.5	4 8 8	B-5					29.0'-30.5' SPT.
30								
						TOTAL DEPTH 30.5'		Water level after drilling at 22.5'. Backfilled hole with cement grout.
35								
40								
45								
50								
55								

E A R T H T E C H

TEST BORING LOG

BOREHOLE NO.: DH-9
WELL NO.: NA

PROJECT NAME: Thompson Creek Levee
PROJECT NO.: 32921.10100
CLIENT: Santa Clara Valley Water District
DRILLING CONTRACTOR: Spectrum Drilling
DRILLING EQUIPMENT: CME 55
DRILLER:
SAMPLING METHOD: SPT; 2 1/2" split spoon
TOTAL DEPTH: 30.50' BGS
START DATE: 10/9/98
COMPLETION DATE: 10/9/98
LOGGED BY: A.S. Buangan
APPROVED BY: S. H. Kline
LOCATION: STA 11+80 TCR
SURFACE ELEVATION:

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						LEVEE FILL 4" Road base; crushed rock. 0.3'-9.0' LEAN CLAY WITH SAND (CL): moderate brown to olive brown; fine to coarse sand; ~10-15% coarse sand and fine gravel; occasional 2" gravel; stiff; dry to slightly damp.		Drilled with 6" hollow stem auger (HA).
	1.3/1.5	5 10 12	L-1A L-1B					2.0'-3.5' Drove 2 1/2" drive sampler with 140 lb. hammer and 30" free fall (CM).
5	1.2/1.5	9 14 14	L-2A L-2B					5.0'-6.5' CM; 2" gravel gouge sides of sample.
	1.2/1.5	3 4 4	B-1					8.0'-9.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT).
						ALLUVIUM 9.0'-14.5' LEAN CLAY WITH SAND (CL): mottled olive gray and moderate brown; fine to coarse sand; traces of fine gravel; medium to high plasticity; stiff; damp; dark brown organic material in contact at 9'.		
10	1.4/1.5	5 9 12	L-3A L-3B					10.0'-11.5' CM.
	1.4/1.5	2 3 4	B-2					14.0'-15.5' SPT.
15						14.5'-28.0' SANDY LEAN CLAY (CL): olive brown; fine to medium sand; medium plasticity; medium consistency; moist.		
	0.8/1.5	2 4 6	L-4					
20								▽ 19.0'-20.5' CM; sample slipped out of liner; soft and wet. Water at 20'.
	1.5/1.5	2	B-3					24.0'-25.5' SPT.

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-9
WELL NO.: NA

PROJECT NAME: Thompson Creek Levee **PROJECT NO.:** 32921.10100 **PAGE:** 2 **OF** 2

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
		4 5			▨			
30	1.5/1.5	4 6 8	B-4		▨	28.0'-30.5' LEAN CLAY (CL); light brownish gray mottled with moderate yellowish brown; ~10% fine gravel; stiff; moist.		29.0'-30.5' SPT.
						TOTAL DEPTH 30.5'		Backfilled hole with cement grout.
35								
40								
45								
50								
55								

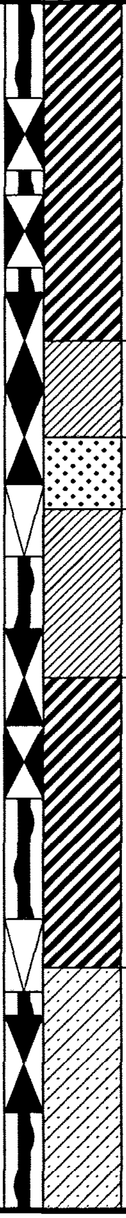
E A R T H T E C H

TEST BORING LOG

BOREHOLE NO.: DH-10
WELL NO.: NA

PAGE: 1 OF 2

PROJECT NAME: Thompson Creek Levee	**PROJECT NO.:** 32921.10100
CLIENT: Santa Clara Valley Water District	**DRILLING CONTRACTOR:** Spectrum Drilling
DRILLING EQUIPMENT: CME 55	**DRILLER:**
SAMPLING METHOD: SPT; 2 1/2" split spoon; Shelby Tube	**TOTAL DEPTH:** 41.50' BGS
START DATE: 10/9/98	**COMPLETION DATE:** 10/9/98
LOGGED BY: A.S. Buangan	**APPROVED BY:** S. H. Kline
LOCATION: STA 18+90 TCR	**SURFACE ELEVATION:**



DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						LEVEE FILL 4" Road base; crushed rock. 0.3'-7.0' FAT CLAY WITH SAND (CH): mottled olive gray to greenish black and moderate brown; ~15-20% fine to coarse sand; ~5-10% fine gravel; stiff; slightly damp; tight.		Drilled with 6" hollow stem auger (HA).
	1.5/1.5	8 11 19	L-1A L-1B					2.0'-3.5' Drove 2 1/2" drive sampler with 140 lb. hammer and 30" free fall (CM).
5	1.5/1.5	5 12 20	L-2A L-2B					4.0'-5.5' CM.
	1.4/2.0	500 PSI	S-1					6.0'-8.0' Pushed 3-inch diameter Shelby tube (P).
						7.0'-9.0' LEAN CLAY WITH SAND (CL): dark brown; fine to coarse sand; ~5% fine gravel; stiff; damp.		
	1.5/2.0	500 PSI	S-2					8.0'-10.0' P.
						ALLUVIUM 9.0'-10.5' WELL GRADED SAND WITH SILT AND GRAVEL (SW): mottled moderate reddish brown and yellowish brown; fine to coarse sand; ~10-15% fine gravel; loose; damp.		Fill/alluvium contact in tube S-2.
10	1.0/1.5	2 3 3	B-1					10.0'-11.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT).
						10.5'-14.0' LEAN CLAY WITH SAND (CL): moderate brown; 15-20% fine to coarse sand; traces of fine gravel; subrounded; medium plasticity; stiff; damp.		
	1.5/2.0	500 PSI	S-3					13.0'-15.0' P.
						14.0'-20.0' FAT CLAY WITH SAND (CH): mottled olive brown to yellow brown and dark yellowish orange; 10-15% fine to coarse sand; traces of fine gravel; medium to stiff; damp to moist.		
15	1.5/1.5	5 11 13	L-3A L-3B					15.0'-16.5' CM.
20	1.2/1.5	2 4 2	B-2					19.0'-20.5' SPT
						20.0'-25.0' CLAYEY SAND WITH GRAVEL (SC): olive brown; fine to coarse sand; ~10% fine gravel; loose; wet.		
	1.4/2.0	700 PSI	S-4					Black organic material at tip of spoon. 21.0'-23.0' P.
								▽ Wet gravelly lenses; water at 23'.

E A R T H T E C H

TEST BORING LOG

BOREHOLE NO.: DH-10
WELL NO.: NA

PROJECT NAME: Thompson Creek Levee **PROJECT NO.:** 32921.10100 **PAGE:** 2 **OF** 2

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
	1.4/1.5	4 3 3	B-3			25.0'-30.5' WELL GRADED SAND WITH GRAVEL (SW): moderate yellowish brown; coarse sand and fine gravel; subangular to subrounded; ~5-10% fines; loose; wet.		25.0'-26.5' SPT. Easy drilling.
30	1.5/1.5	4 7 11	B-4			30.5'-34.5' FAT CLAY WITH SAND (CH): mottled olive gray and yellowish brown; fine to medium sand; stiff; damp.		30.0'-31.5' SPT. Easy drilling.
35	1.5/1.5	11 16 18	B-5			34.5'-40.0' WELL GRADED SAND WITH CLAY AND GRAVEL (SW): mottled yellowish brown and brownish gray; fine to coarse sand; ~10% fine gravel; ~10-15% clay/silt fines; very dense; damp.		35.0'-36.5' SPT. Easy drilling.
40	1.3/1.5	4 6 7	B-6			40.0'-41.5' FAT CLAY WITH SAND (CH): mottled dark yellowish orange and olive brown; fine to very fine sand; stiff; damp. TOTAL DEPTH 41.5'		40.0'-41.5' SPT. Backfilled hole with cement grout.
45								
50								
55								

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-11
WELL NO.: NA

PAGE: 1 OF 2

PROJECT NAME: Thompson Creek Levee	**PROJECT NO.:** 32921.10100
CLIENT: Santa Clara Valley Water District	**DRILLING CONTRACTOR:** Spectrum Drilling
DRILLING EQUIPMENT: CME 55	**DRILLER:**
SAMPLING METHOD: SPT; 2 1/2" split spoon	**TOTAL DEPTH:** 33.50' BGS
START DATE: 10/8/98	**COMPLETION DATE:** 10/8/98
LOGGED BY: A.S. Buangan	**APPROVED BY:** S. H. Kline
LOCATION: STA 27+00 TCR	**SURFACE ELEVATION:**

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						LEVEE FILL 4" Road base; crushed rock. 0.3'-6.5' LEAN CLAY WITH SAND (CL): greenish black; ~10% angular gravel; ~20% fine to coarse sand; stiff; dry to slightly damp.		Drilled with 6" hollow stem auger (HA).
	1.5/1.5	9 10 12	L-1A L-1B					2.0'-3.5' Drove 2 1/2" drive sampler with 140 lb. hammer and 30" free fall (CM).
5	1.5/1.5	6 9 13	L-2A L-2B					5.0'-6.5' CM.
						ALLUVIUM 6.5'-10.0' LEAN CLAY WITH SAND (CL): moderate yellowish brown; ~10-20% fine to coarse sand; ~5% fine gravel; medium to stiff.		
10	1.5/1.5	4 7 10	L-3A L-3B			10.0'-13.0' WELL GRADED SAND WITH SILT AND GRAVEL (SW): moderate yellowish to reddish brown; fine to coarse sand; ~10% fine gravel; ~15-20% slightly plastic to non-plastic fines; medium dense; slightly damp.		10.0'-11.5' CM. Well graded sand, silt and gravel in sampler. Slow drilling.
						13.0'-17.0' LEAN CLAY (CL): moderate reddish brown; ~10% fine to coarse sand; traces of fine gravel; medium to stiff; slightly damp.		
15								
	1.3/1.5	3 4 6	B-1					16.0'-17.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT).
						17.0'-18.0' CLAYEY SAND WITH GRAVEL (SC): moderate reddish brown; fine to coarse sand; ~5-10% fine gravel; moderately plastic fines; medium dense; damp.		Slow drilling.
						18.0'-31.0' LEAN CLAY WITH SAND (CL): moderate yellowish brown; ~10-20% fine to coarse sand; traces of fine gravel; stiff; damp.		▽
20								
	1.5/1.5	5 8 10	B-2					21.0'-22.5' SPT

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-11
WELL NO.: NA

PROJECT NAME: Thompson Creek Levee
PROJECT NO.: 32921.10100
PAGE: 2 OF 2

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
	1.5/1.5	3 5 7	B-3			Lean clay; mottled yellowish brown and brownish gray; ~10-15% fine to medium sand; stiff; moist.		27.0'-28.5' SPT.
30								
	1.2/1.5	7 6 4	B-4			31.0'-33.5' CLAYEY SAND interbedded with WELL GRADED SAND WITH SILT AND GRAVEL (SW-SC): moderate yellowish brown; moderately plastic fines; medium dense; saturated.		32.0'-33.5' SPT.
						TOTAL DEPTH 33.5'		Water level after drilling at 19.8'. Backfilled hole with cement grout.
35								
40								
45								
50								
55								

TEST BORING LOG

EARTH TECH

BOREHOLE NO.: DH-12
WELL NO.: NA

PAGE: 1 OF 2

PROJECT NAME: Thompson Creek Levee	**PROJECT NO.:** 32921.10100
CLIENT: Santa Clara Valley Water District	**DRILLING CONTRACTOR:** Spectrum Drilling
DRILLING EQUIPMENT: CME 55	**DRILLER:**
SAMPLING METHOD: SPT; 2 1/2" split spoon	**TOTAL DEPTH:** 31.50' BGS
START DATE: 10/8/98	**COMPLETION DATE:** 10/8/98
LOGGED BY: A.S. Buangan	**APPROVED BY:** S. H. Kline
LOCATION: STA 34+90 TCR	**SURFACE ELEVATION:**

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						LEVEE FILL 4" Road base; crushed rock. 0.3'-6.0' LEAN CLAY WITH SAND (CL): moderate brown; ~15-20% coarse sand to fine gravel; moderately plastic fines; stiff; damp.		Drilled with 6" hollow stem auger (HA).
	1.3/1.5	24 13 19	L-1A L-1B					2.0'-3.5' Drove 2 1/2" drive sampler with 140 lb. hammer and 30" free fall (CM).
5								
	1.0/1.5	5 6 7	B-1			ALLUVIUM 6.0'-15.0' LEAN CLAY WITH GRAVEL (CL): moderate brown; ~10-15% fine to coarse sand; ~10-15% fine gravel; stiff; dry to slightly damp.		6.0'-7.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT).
10	1.5/1.5	4 8 12	L-2A L-2B					10.0'-11.5'CM.
								Slow drilling.
15	1.4/1.5	4 5 8	B-2			15.0'-23.0" LEAN CLAY (CL): moderate yellowish brown; ~5-10% fine to coarse sand; ~10-15% fine gravel; stiff; slightly damp.		15.0'-16.5' SPT
								Slow, stiff drilling.
20	1.4/1.5	3 4 8	B-3					20.0'-21.5' SPT.
								▽ Slow drilling.
						23.0'-27.0' LEAN CLAY WITH SAND (CL): mottled yellow brown and brownish gray; fine to medium sand; lenses of saturated clayey sand; medium		

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-12

WELL NO.: NA

PROJECT NAME: Thompson Creek Levee **PROJECT NO.:** 32921.10100 **PAGE:** 2 OF 2

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
	1.4/1.5	2 3 4	B-4			consistency; moist.		25.0'-26.5' SPT. Sampler wet; water at 22.5'.
						27.0'-31.5' WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): moderate yellowish brown; ~10-15% slightly plastic to non-plastic fines; subangular to subrounded sand and fine gravel; medium dense; saturated.		Soft, easy drilling at 27'.
30	1.2/1.5	4 7 8	B-5					30.0'-31.5' SPT.
						TOTAL DEPTH 31.5'		Backfilled hole with cement grout.
35								
40								
45								
50								
55								

EARTH TECH

TEST BORING LOG

BOREHOLE NO.: DH-13
WELL NO.: NA

PAGE: 1 OF 2

PROJECT NAME: Thompson Creek Levee	**PROJECT NO.:** 32921.10100
CLIENT: Santa Clara Valley Water District	**DRILLING CONTRACTOR:** Spectrum Drilling
DRILLING EQUIPMENT: CME 55	**DRILLER:**
SAMPLING METHOD: SPT; 2 1/2" split spoon	**TOTAL DEPTH:** 24.50' BGS
START DATE: 10/8/98	**COMPLETION DATE:** 10/8/98
LOGGED BY: A.S. Buangan	**APPROVED BY:** S. H. Kline
LOCATION: STA 41+70 TCR	**SURFACE ELEVATION:**

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						LEVEE FILL 0'-5.0' FAT CLAY WITH SAND (CH): olive black to moderate yellowish brown; ~10-15% fine to coarse sand; ~5% fine gravel; very stiff; dry.		Drilled with 6" hollow stem auger (HA).
	1.3/1.5	11 18 25	L-1A L-1B					2.0'-3.5' Drove 2 1/2" drive sampler with 140 lb. hammer and 30" free fall (CM).
5						ALLUVIUM 5.0'-18.0' LEAN CLAY WITH SAND (CL): moderate yellowish brown; ~20% fine to coarse sand; ~5% fine gravel; stiff; dry.		
	0.5/1.5	5 6 7	B-1					6.0'-7.5' Drove standard Penetration Test with 140 lb. hammer and 30" free fall (SPT).
10	1.0/1.5	6 13 16	B-2			Lean clay; very stiff; damp.		10.0'-11.5'SPT.
								Slow, stiff drilling.
15	1.2/1.5	5 8 14	B-3					15.0'-16.5' SPT
								Very slow, stiff drilling.
						18.0'-23.5' LEAN CLAY WITH SAND (CL): moderate yellowish brown; fine to medium sand; ~10% coarse sand to fine gravel; medium to stiff; moist.		
20	1.2/1.5	3 4 6	B-4					19.0'-20.5' SPT.
	1.2/1.5	6 7 3	B-5			23.5'-24.5' WELL GRADED SAND WITH SILT AND GRAVEL (SW): moderate yellowish brown;		▽ 23.0'-24.5' SPT. Water at 23'.

DEPTH	RECOVERY / RQD	BLOW COUNT	SAMPLE NO.	MODE	SOIL CLASS / GRAPHIC LOG	DESCRIPTION	PID READING (PPM)	REMARKS
						~10-15% subangular fine gravel; medium dense; saturated. TOTAL DEPTH 24.5'		Backfilled hole with cement grout.
30								
35								
40								
45								
50								
55								

APPENDIX B

LABORATORY TEST DATA

APPENDIX B

LABORATORY TEST DATA

This appendix contains summary tables of laboratory test results and the individual test data extracted from the report of testing work performed by Dames & Moore for this project (Dames & Moore, 1999). Reference is made to the subject report for all of the laboratory testing raw data. The key data of individual test results is provided herein for reference and convenience, and is organized as follows:

- Summary tables of testing program and test results.
- Grain size analyses.
- Atterberg limits.
- Moisture and density tests.
- Compaction tests.
- Consolidation tests.
- Unconfined compression tests.
- Unconsolidated undrained triaxial compression tests.
- Consolidated drained direct shear tests.
- Consolidated undrained triaxial compression tests with pore pressure measurements.

Laboratory Testing for Thompson Creek
Flood Control Levees, San Jose, California
Santa Clara Valley Water District

Table 1
Testing Program Summary

Levee Hole	Test Type	Requested	Completed
DH1-13	Water Content	7	12
DH1-13	Unit Weight	7	12
DH1, 2, 4-6, 8, 10-12	Atterberg Limits	16	16
DH1, 2, 4-7, 10-12	Sieve Analysis	18	19
DH2-3, 7-8, 12	Percent Fines	6	5
DH6, 10, 12	Compaction	3	3
DH1-2, 4, 10	Consolidation	4	4
DH2-3, 5, 9, 11	Direct Shear	4	5
DH3, 5, 7, 9, 12	TX-Unconfined	8	8
DH1-4, 6-7, 9-12	TXUU	10	6
DH1-2, 4, 6, 8, 10, 11	TXCU	8	10

Notes:

1. Water Content and Unit Weight
   - 5 of the 12 tests were performed having not realized that other tests had been assigned for the same sample.
   - 45 additional moisture-density results were obtained from consolidation and triaxial testing.

2. Sieve Analysis
   - 1 sieve analysis was added to replace 1 percent fines determination.

3. Percent Fines
   - 1 percent fines determination was replaced by a sieve analysis.

4. Direct Shear
   - all tests included 3 separate specimens except 2 tests.
   - 1 test on DH11,L1b included only 2 specimens because of lack of soil.
   - 1 test was added as a replacement for a TXUU on DH9,L2a because of insufficient soil to run the TXUU. This DSCD test had 1 specimen.

5. TXUU
   - 4 tests were not completed due to insufficient or disturbed soil.

6. TXCU
   - Five tests were performed with 2 separate specimens (two confining pressures). Five tests were performed with only 1 separate specimen due to insufficient soil for the second confining pressure.

Laboratory Testing for Thompson Creek
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Santa Clara Valley Water District

Table 2
Testing Program

X = tests completed
/ = test requested but not conducted

WC = water content
UW = unit weight
AL = Atterberg limits
SA = sieve analysis

-200 = % passing #200 sieve
COMP = compaction
CONS = consolidation
DSCD = consol. drained direct shear

TX-unc = unconfined triaxial
TXUU = unconsol. undrained triaxial
TXCU = consol. undrained triaxial

Levee Hole	Sample No.	Depth (feet)	WC	UW	AL	SA	-200	COMP	CONS	DSCD	TX-unc	TXUU	TXCU	Comments
DH1	L1A	2.5-3										/		disturbed soil for TXUU
	L1B	3-3.5	X	X								/		insuff. soil for TXUU (sub. DH1,L1A)
	S1	8.5-10	X	X	X	X			X					
	S2	18-20	X	X	X	X			/			/	X	insuff. soil for CONS,TXUU (sub. DH4,S3)
	B1	5-6.5												
	B2	13-14.5												
	B3	23-24.5												
	B4	28-29.5				X								
DH2	L1A	2.5-3												
	L1B	3-3.5	X	X										
	S1	5.6-7	X	X	X	X	/		X	X				substituted SA for -200
	S2	12-14	X	X	X		X					X	X	
	S3	17.5-19												
	B1	1.5-2												
	B2	8-9.5												
	B3	20-21.5												
	B4	23.5-25												
DH3	L1A	6-6.5	X	X							X			
	L1B	6.5-7												

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COMP = compaction
CONS = consolidation
DSCD = consol. drained direct shear

TX-unc = unconfined triaxial
TXUU = unconsol. undrained triaxial
TXCU = consol. undrained triaxial

Levee Hole	Sample No.	Depth (feet)	WC	UW	AL	SA	-200	COMP	CONS	DSCD	TX-unc	TXUU	TXCU	Comments
	S1	10.2-12	X	X			X			X		/		disturbed soil for TXUU
	L2A	20-20.5												
	L2B	20.5-21	X	X							X			
	B1	2-3.5												
	B2	15-16.5												
	B3	25-26.5												
	B4	30-31.5												
DH4	S1	6.6-8												
	S2	16.1-18	X	X	X	X							X	
	S3	19-21	X	X					X			X		
	B1	2-3.5												
	B2	11-12.5												
DH5	S1	3.1-5												
	L1A	11-11.5	X	X							X			
	L1B	11.5-12												
	L2A	19-19.5												
	L2B	19.5-20	X	X							X			
	S2	23.5-25	X	X	X	X				X				
	B1	7-8.5												

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CONS = consolidation
DSCD = consol. drained direct shear

TX-unc = unconfined triaxial
TXUU = unconsol. undrained triaxial
TXCU = consol. undrained triaxial

Levee Hole	Sample No.	Depth (feet)	WC	UW	AL	SA	-200	COMP	CONS	DSCD	TX-unc	TXUU	TXCU	Comments
	B2	15-16.5												
	B3	26-27.5												
DH6	L1A	5.5-6	X	X									/	insuff. soil for TXCU (sub. DH8,L1B)
	L1B	6-6.5	X	X	X	X							X	only 1 point for TXCU due to insuff. soil;
														second point on DH8,L1B
	S1	10-12	X	X	X	X						X	X	
	B1	1-2.5												
	B2	7-8.5												
	B3	15-16.5												
	B4	20-21.5												
	B5	25-26.5												
	B6	30-31.5				X								
	B7	35-36.5												
	BK3				X	X		X						
DH7	L1A	8.5-9												
	L1B	9-9.5	X	X							X			
	L2A	18.5-19												
	L2B	19-19.5	X	X								X		
	L3	26-26.5												

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-200 = % passing #200 sieve
COMP = compaction
CONS = consolidation
DSCD = consol. drained direct shear

TX-unc = unconfined triaxial
TXUU = unconsol. undrained triaxial
TXCU = consol. undrained triaxial

Levee Hole	Sample No.	Depth (feet)	WC	UW	AL	SA	-200	COMP	CONS	DSCD	TX-unc	TXUU	TXCU	Comments
	B1	1-2.5												
	B2	4-5.5												
	B3	13-14.5												
	B4	25-26					X							
	B5	30-31.5				X								
DH8	L1A	1-1.5												
	L1B	1.5-2	X	X	/		/						X	only 1 point for TXCU due to insuff. soil;
														second point on DH6,L1B
	L2A	10.5-11												
	L2B	11-11.5	X	X										
	L3A	20.5-21												
	L3B	21-21.5	X	X										
	S1	25-27.5												
	B1	2-2.5												
	B2	5-6.5												
	B3	7-8.5												
	B4	15-16.5												
	B5	29-30.5												
DH9	L1A	2.5-3	X	X							X			

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-200 = % passing #200 sieve
COMP = compaction
CONS = consolidation
DSCD = consol. drained direct shear

TX-unc = unconfined triaxial
TXUU = unconsol. undrained triaxial
TXCU = consol. undrained triaxial

Levee Hole	Sample No.	Depth (feet)	WC	UW	AL	SA	-200	COMP	CONS	DSCD	TX-unc	TXUU	TXCU	Comments
	L1B	3-3.5	X	X										
	L2A	5.5-6	X	X						X		/		insuff. soil for TXUU; ran DSCD instead
	L2B	6-6.5												
	L3A	10-10.5												
	L3B	10.5-11	X	X							X			
	L4	19.5-20												
	B1	8-9.5												
	B2	14-15.5												
	B3	24-25.5												
	B4	29-30.5												
DH10	L1A	2.5-3										X		
	L1B	3-3.5	X	X									/	insuff. soil for TXCU
	L2A	4.5-5	X	X								/		insuff. soil for TXUU (sub. DH10,L1A)
	L2B	5-5.5	X	X	X	X							X	insuff. soil for 2 TXCU points; completed 1
	S1	6.6-8	X	X	X	X							X	insuff. soil for 2 TXCU points; completed 1;
														(sub. DH11,L2B for second point)
	S2	8.5-10												
	S3	13.5-15	X	X	X	X			X				X	
	L3A	15.5-16												
	L3B	16-16.5	X	X								/		untestable soil for TXUU (sub. DH10,L3A)

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COMP = compaction
CONS = consolidation
DSCD = consol. drained direct shear

TX-unc = unconfined triaxial
TXUU = unconsol. undrained triaxial
TXCU = consol. undrained triaxial

Levee Hole	Sample No.	Depth (feet)	WC	UW	AL	SA	-200	COMP	CONS	DSCD	TX-unc	TXUU	TXCU	Comments
	S4	20.6-23												
	B1	10-11.5												
	B2	19-20.5												
	B3	25-26.5				X								
	B4	30-31.5												
	B5	35-36.5												
	B6	40-41.5												
	BK2				X	X		X						
DH11	L1A	2.5-3	X	X						/				insuff. soil for DSCD
	L1B	3-3.5	X	X	X	X				X				insuff. soil for 3 DSCD points; completed 2;
														(sub. third point with TXUU on DH12,L1A)
	L2A	5.5-6	X	X								/		insuff. soil for TXUU (sub. DH9,L2A)
	L2B	6-6.5	X	X									X	only 1 point to combine with DH10,S1
	L3A	10.5-11												
	L3B	11-11.5				X								
	B1	16-17.5												
	B2	21-22.5												
	B3	27-28.5												
	B4	32-33.5												

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AL = Atterberg limits
SA = sieve analysis

-200 = % passing #200 sieve
COMP = compaction
CONS = consolidation
DSCD = consol. drained direct shear

TX-unc = unconfined triaxial
TXUU = unconsol. undrained triaxial
TXCU = consol. undrained triaxial

Levee Hole	Sample No.	Depth (feet)	WC	UW	AL	SA	-200	COMP	CONS	DSCD	TX-unc	TXUU	TXCU	Comments
DH12	L1A	2.5-3	X	X								X		
	L1B	3-3.5	X	X							X			
	L2A	10.5-11												
	L2B	11-11.5	X	X							/			disturbed soil for TX-unc
	B1	6-7.5												
	B2	15-16.5												
	B3	20-21.5												
	B4	25-26.5												
	B5	30-31.5					X							
	BK1				X	X		X						
DH13	L1A	2-2.5												
	L1B	2.5-3	X	X										
	B1	6-7.5												
	B2	10-11.5												
	B3	15-16.5												
	B4	19-20.5												
	B5	23-24.5												

Laboratory Testing for Thompson Creek Flood Control Levees, San Jose, California
Santa Clara Valley Water District

Table 3
Summary of Index Test Results

Levee Hole	Sample No.	Sample Depth (ft)	Soil Type	Total Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Passing #200 Sieve (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index
DH-1	L1b	3-3.5	CL	130.8	115.8	12.9				
	S1	8.5-10	CL	105.6	90.2	17.1	63.2	31.5	16.8	14.7
	S2	18-20	CH	129.8	110.4	17.5	62.2	38.1	16.7	21.4
	S2	18-20	CH	132.4	112.5	17.7				
	B4	28-29.5	SC				30.5			
DH-2	L1b	3-3.5	SC	125.3	115.8	8.2				
	S1	5.6-7	CH/CL	128.1	108.9	17.6	71.8	41.9	19.6	22.4
	S1	5.6-7	CH/CL	127.7	107.5	18.8				
	S1	5.6-7	CL	126.6	106.6	19.8				
	S1	5.6-7	CH/CL	128.4	108.7	18.1				
	S2	12-14	CL	129.4	109.0	18.7	67.1	37.7	16.8	20.9
	S2	12-14	CL	132.9	112.7	17.9				
	S2	12-14	CL	129.5	109.1	18.7				
DH-3	L1a	6.0-6.5	CL	132.6	116.9	13.4				
	L2b	20.5-21	CL	133,7	114.2	17.1				
	S1	10-12	CH/CL	107.2	85.7	25.0	94.9			
	S1	10-12	CH/CL	117.3	93.7	25.1				
	S1	10-12	CH/CL	123.9	100.2	23.7				
DH-4	S2	16-18	SC	134.0	114.6	17.0	37.3	37.7	18.0	19.7
	S2	16-18	SC	137.0	118.2	15.9				
	S3	19-21	CL	126.0	103.0	22.4				
	S3	19-21	CH/CL	125.6	103.5	21.3				
DH-5	L1a	11-11.5	CH	135.0	116.8	15.6				
	L2b	19.5-20	CL	135.0	115.6	16.7				
	S2	23-25	CL	123.4	98.5	25.3	69.6	33.9	17.4	16.5
	S2	23-25	CL	124.8	101.9	22.5				
	S2	23-25	CL	121.7	96.4	26.1				
DH-6	BK-3	bulk	SC				43.8	29.9	16.7	13.1
	L1a	5.5-6	CL/SC	128.5	115.3	11.5				
	L1b	6-6.5	CL/SC	139.1	123.3	12.8	44.6	31.3	17.0	14.3
	S1	10-12	CL	115.2	98.9	16.5	73.4	36.5	17.6	18.9
	S1	10-12	CL	112.0	96.1	16.6				
	S1	10-12	CL	115.1	99.6	15.5				
	B6	30-31.5	ML				63.0			

Laboratory Testing for Thompson Creek Flood Control Levees, San Jose, California
Santa Clara Valley Water District

Table 3
Summary of Index Test Results

Levee Hole	Sample No.	Sample Depth (ft)	Soil Type	Total Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Passing #200 Sieve (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index
DH-7	L1b	9-9.5	CL	116.6	104.7	11.3				
	L2b	19-19.5	CL	132.0	115.6	14.2				
	B4	25-26	-				11.3			
	B5	30-35.5	SW-SM				10.9			
DH-8	L1b	2.2-3	CH	118.9	101.0	17.7	96.0	56.5	22.9	33.6
	L2b	11-11.5	SC	125.8	112.8	11.5				
	L3b	21-21.5	CL	123.9	104.6	18.5				
DH-9	L1b	3-3.5	CL	131.0	114.7	14.2				
	L2a	5.5-6	CL	133.2	118.6	12.3				
	L3b	10.5-11	CH	116.1	92.3	25.9				
DH-10	BK-2	bulk	CL				73.7	45.4	18.7	26.7
	L1a	2.5-3	CH/CL	132.5	113.3	16.9				
	L1b	3-3.5	CL	123.9	104.6	18.5				
	L2a	4.5-5	CL	138.2	120.7	14.5				
	L2b	5-5.5	SC	135.9	123.0	10.5	39.3	29.1	16.1	13.1
	L3a	15.5-16	CH/CL	126.4	103.8	21.9				
	L3b	16-16.5	CL	123.8	100.9	22.7				
	S1	6-8	SC	141.0	125.9	11.2	45.5	34.7	17.3	17.5
	S3	13.5-15	CL/CH	115.6	93.8	23.2	87.3	50.5	20.0	30.5
	S3	13.5-15	CL/CH	127.2	103.7	22.7				
	S3	13.5-15	CL	122.0	100.7	21.1				
	B3	25-26.5	SW-SM				6.6			
DH-11	L1a	2.5-3	CL	134.6	119.6	12.6				
	L1b	3-3.5	CL	132.9	117.3	13.4	46.0	34.0	17.4	16.6
	L1b	3-3.5	CL	134.3	119.7	12.2				
	L2a	5.5-6	CL	125.4	110.5	13.5				
	L2b	6-6.5	CL	135.8	119.9	13.3				
	L3b	11-11.5	SC				24.3			
DH-12	BK-1	bulk	SC				42.4	31.3	16.3	15.0
	L1a	2.5-3	CL	134.1	121.2	10.7				
	L1b	3-3.5	CL	137.3	125.2	9.6				
	B5	30-31.5	-				24.9			
DH-13	L1b	2.5-3	CL	132.1	120.2	9.9				

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Table 4
Summary of Atterberg Limits Results

Levee Hole	Sample No.	Sample Depth (ft)	Soil Type	Passing #200 Sieve (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index
DH-1	S2	18-20	CL	62.2	38.1	16.7	21.4
	S1	8.5-10	CL	63.2	31.5	16.8	14.7
DH-2	S1	5.6-7	CL	71.8	41.9	19.6	22.4
	S2	12-14	CL	67.1	37.7	16.8	20.9
DH-4	S2	16-18	CL	37.3	37.7	18.0	19.7
DH-5	S2	23-25	CL	69.6	33.9	17.4	16.5
DH-6	BK-3	bulk	SC	43.8	29.9	16.7	13.1
	L 1b	6-6.5	CL	44.6	31.3	17.0	14.3
	S1	10-12	CL	73.4	36.5	17.6	18.9
DH-8	L 1b	2.5-3	CH	96.0	56.5	22.9	33.6
DH-10	BK-2	bulk	CL	73.7	45.4	18.7	26.7
	L 2b	5-5.5	SC	39.3	29.1	16.1	13.1
	S1	6-8	CL	45.5	34.7	17.3	17.5
	S3	13.5-15	CL	87.3	50.5	20.0	30.5
DH-11	L 1b	3-3.5	CL	46.0	34.0	17.4	16.6
DH-12	BK-1	bulk	SC	42.4	31.3	16.3	15.0

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Table 5
Summary of Compaction Test Results

Levee Hole	Sample No.	Sample Depth (ft)	Soil Type	Fines Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Optimum Moisture Content (%)	Maximum Dry Density (pcf)
DH-6	BK-3	bulk	SC	43.8	29.9	16.7	13.1	10.3	130.7
DH-10	BK-2	bulk	CL	73.7	45.4	18.7	26.7	12.6	121.8
DH-12	BK-1	bulk	SC	42.4	31.3	16.3	15.0	8.9	130.2

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Table 6
Summary of Consolidation Test Results

Levee Hole	Sample No.	Sample Depth (ft)	Soil Type	Total Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Maximum Past Pressure (psf)	CR	RR	SR
DH-1	S1	8.5-10	CL/ML	105.6	17.1	31.5	16.8	14.7	1,470	0.14	0.01	0.015
DH-2	S1	5.6-7	CL	126.6	19.8	41.9	19.6	22.4	8,000	0.12	0.01	0.034
DH-4	S3	19-21	CH/CL	125.6	21.3				6,370	0.12	0.01	0.029
DH-10	S3	13.5-15	CL	122	21.1	50.5	20.0	30.5	4,100	0.13	0.01	0.033

Note:
1) CR Compression Ratio
2) RR Recompression Ratio
3) SR Swelling Ratio

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Flood Control Levees, San Jose, California
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Table 7
Summary of Consolidated Drained Direct Shear (CDDS) Test Results

Levee Hole	Sample No.	Sample Depth (ft)	Soil Type	Passing #200 Sieve (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Cohesive Intercept (psf)	Friction Angle	Confining Pressure (psf)	Shear Strength (psf)	Total Density (pcf)	Dry Density (pcf)	Moisture Content (%)
DH-2	S1	5.6-7	CH/CL	78.1	41.9	19.6	22.4	500	25	750	826	128.4	108.7	18.1
										1,500	1,225	127.7	107.5	18.8
										3,000	1,875	128.1	108.9	17.6
DH-3	S1	10-12	CH/CL	94.9				100	29	1,500	858	107.2	85.7	25.0
										2,500	1,514	117.3	93.7	25.1
										4,000	2,303	123.9	100.2	23.7
DH-5	S2	23.5-25	CL	69.6	33.9	17.4	16.5	250	25	2,500	1,395	121.6	96.4	26.1
										4,000	2,095	124.8	101.9	22.5
										5,000	2,548	123.4	98.5	25.3
DH-9	L2a	5.5-6	CL							1,000	1,065	133.2	118.6	12.3
DH-11	L 1b	3-3.5	CL	46.0	34.0	17.4	16.6	525	34	500	833	134.3	119.7	12.2
										2,000	1,841	133.0	117.3	13.4

Laboratory Testing for Thompson Creek
Flood Control Levees, San Jose, California
Santa Clara Valley Water District

Table 8
Summary of Unconfined Compression (UC) Test Results

Levee Hole	Sample No.	Sample Depth (ft)	Soil Type	Total Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Shear Strength (psf)
DH-3	L 1a	6.0-6.5	CL	132.6	116.9	13.4	2,834
	L 2b	20.5-21	CL	133.7	114.2	17.1	1,522
DH-5	L 1a	11-11.5	CH	135	116.8	15.6	3,661
	L 2b	19.5-20	CL	135	115.6	16.7	733
DH-7	L 1b	9-9.5	CL	116.6	104.7	11.3	1,892
DH-9	L 3b	10.5-11	CH	116.1	92.3	25.9	2,342
DH-12	L 1b	3-3.5	CL	137.3	125.2	9.6	3,414

Laboratory Testing for Thompson Creek
Flood Control Levees, San Jose, California
Santa Clara Valley Water District

Table 9
Summary of Unconsolidated Undrained Triaxial Compression (TXUU) Test Results

Levee Hole	Sample No.	Sample Depth (ft)	Soil Type	Total Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Passing #200 Sieve (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Confining Pressure (psf)	Shear Strength (psf)
DH-2	S2	12-14	CL	129.5	109.1	18.7	67.1	37.3	16.8	20.9	1,440	1,188
DH-4	S3	19-21	CL	126.0	103	22.4					2,160	540
DH-6	S1	10-12	CL	115.2	98.9	16.5	73.4	36.5	17.6	18.9	1,440	1,623
DH-7	L2b	19-19.5	CL	132.0	115.6	14.2					2,160	2,222
DH-10	L1a	2.5-3	CH/CL	132.5	113.3	16.9					720	3,395
	L3a	15.5-16	CH/CL	126.4	103.8	21.9					2,160	3,144
DH-12	L1a	2.5-3	CL	134.1	121.2	10.7					720	2,830

Laboratory Testing for Thompson Creek
Flood Control Levees, San Jose, California
Santa Clara Valley Water District

Table 10
Summary of Consolidated Undrained Triaxial Compression (TXCU) Test Results

Levee Hole	Sample No.	Sample Depth (ft)	Soil Type	Passing #200 Sieve (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Confining Pressure (psf)	Shear Strength (psf)	Total Density (pcf)	Dry Density (pcf)	Moisture Content (%)	Cohesive Intercept (psf)	Effective Friction Angle (deg)
DH-1	S2	18-20	CH	62.2	38.1	16.7	21.4	2,160	1,661	129.8	110.4	17.5	0.0	36.0
								4,320	2,149	132.4	112.5	17.7		
DH-2	S2	12-14	CL	67.1	37.7	16.8	20.9	1,440	1,286	129.4	109.0	18.7	225.0	28.3
								4,320	2,111	132.9	112.7	17.9		
DH-4	S2	16-18	SC	37.3	37.7	18	19.7	2,160	1,149	134.0	114.6	17.0	60.0	33.1
								4,320	2,043	137.0	118.2	15.9		
DH-6	L 1a	5.5-6	CL/SC	Performed only MD on this sample						128.5	115.3	11.5	-	-
DH-6	L 1b	6-6.5	CL/SC	44.6	31.3	17.0	14.3	1,080	3,291	139.1	123.3	12.8	473.0	32.2
DH-6	S1	10-12	CL	73.4	36.5	17.6	18.9	1,440	532	112.0	96.1	16.6	0.0	26.1
								3,600	916	115.1	99.6	15.5		
DH-8	L1b	2.2-3	CH					2,880	1,983	119	101	18	0.0	30.0
DH-10	L 2b	5-5.5	CL/SC	39.3	29.1	16.1	13.1	720	2,602	135.9	123.0	10.5	237.0	32.5
DH-10	S1	6-8	CL/SC	45.5	34.7	17.3	17.5	1,080	4,741	141.0	125.9	11.2	479.0	33.4
DH-10	S3	13.5-15	CL/CH	87.3	50.5	20	30.5	1,440	707	115.6	93.8	23.2	0.0	29.7
								3,600	2,613	127.2	103.7	22.7		
DH-11	L2b	6-6.5	CL					2,880	3,807	136	120	13	0.0	38.0

GRAIN SIZE ANALYSES

PERCENT PASSING # 200 SIEVE

Client :

Project : Thompson Creek

Job no :

Boring #	DH - 7	DH - 12	DH - 2	DH - 3				
Sample #	B4	B5	S - 2	S - 1				
Depth (ft.)	25-26	30-31.5	12-14	10-12				
Soil type: (visual)								
1. Date tested:	12/1/98							
2. Tested by:	BC							
3. Specimen height (in.)								
4. Wt. of specimen + tare (gm)								
5. Tare wt. (gm)								
6. Diameter (in.)								
7. Wet wt. of soil + dish wt. (gm)								
8. Dry wt. of soil + dish wt. (gm)	687.8	419.1	651.5	448.4				
9. Wt. of dish (gm)	107.3	110.2	165.7	114.3				
10. Dish ID	911	AR3	EG-1	928				

Wet Density (pcf)	--	--	--	--				
Dry Density (pcf)	--	--	--	--				
Moisture Content (%)	--	--	--	--				

Additional data:

Wt. of dry soil + dish before washing (gm)	687.8	419.1	651.5	448.4				
Wt. of dry soil + dish after washing (gm)	622.1	342.3	325.4	131.2				
Wt. of # 4 mat'l retained (gm)								
% Passing # 4 sieve								
% Passing # 200 sieve	11.3	24.9	67.1	94.9				
USCS symbol								

MOISTURE & DENSITY TEST (with % - #200 as needed)

Client : ______ Project : Thompson Creek Job no : --

	Boring #	DH - 8								
	Sample #	L 1b								
	Depth (ft.)	2.5 - 3								
	Soil type: (visual)	CH								
1.	Date tested:	1/14/99								1.
2.	Tested by:	WL/BC								2.
3.	Specimen height (in.)									3.
4.	Wt. of specimen + tare (gm)									4.
5.	Tare wt. (gm)									5.
6.	Diameter (in.)									6.
7.	Wet wt. of soil + dish wt. (gm)									7.
8.	Dry wt. of soil + dish wt. (gm)	546.0								8.
9.	Wt. of dish (gm)	106.6								9.
10.	Dish ID	AR2								10.

Wet Density (pcf)	--							
Dry Density (pcf)	--							
Moisture Content (%)	--							

Additional data:

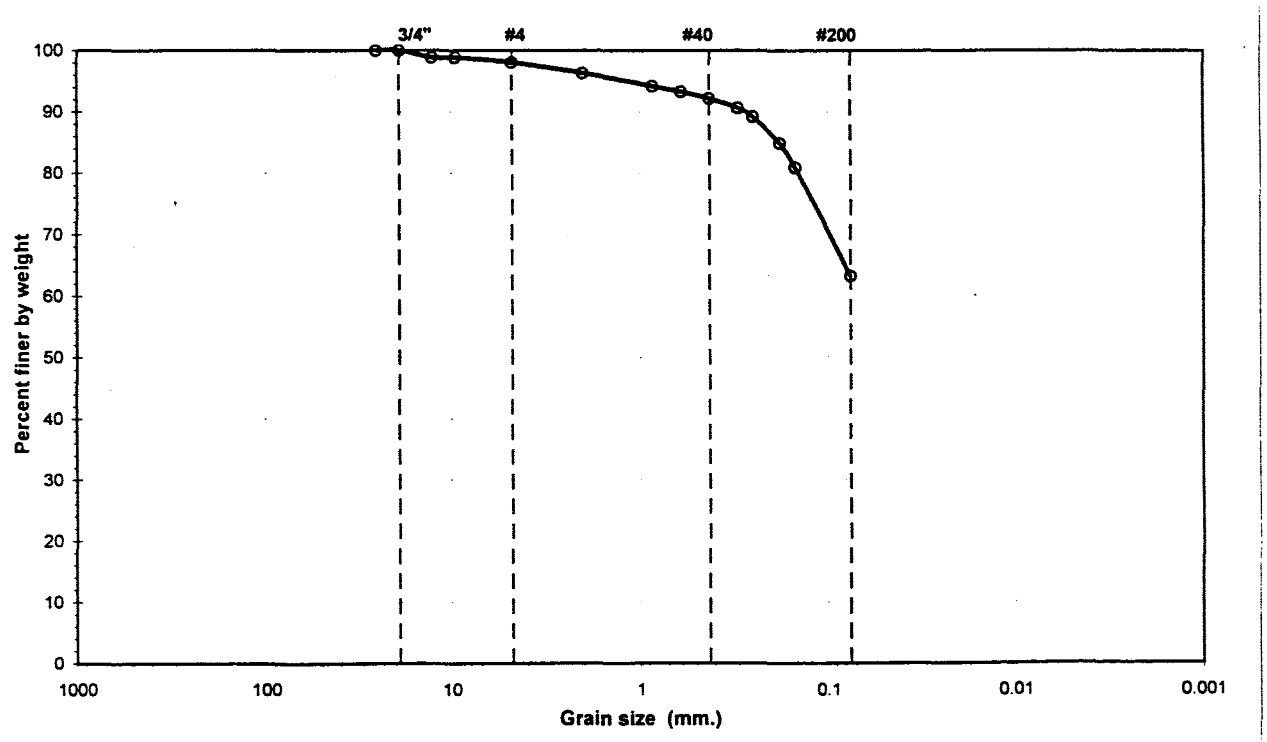
Wt. of dry soil + dish before washing (gm)	546.0							
Wt. of dry soil + dish after washing (gm)	124.2							
Wt. of # 4 mat'l retained (gm)								
% Passing # 4 sieve								
% Passing # 200 sieve	96.0							
USCS symbol								

GRAIN SIZE ANALYSIS

Job # : –
Client : Santa Clara Valley Water District
Project : Thompson Creek
Sample ID : DH -1 S-1 Depth 8.5-10 ft.
Date tested : 12-98
Tested by : BC
Soil : (CL) Dark brown sandy clay w/ trace gravel

Dish # 918
Wt of Dry Soil + Dish (gm) = 305.8
Dish Wt. (gm) = 0.0
Net Wt. (gm) = 305.8

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	0.0	100.0	1.00	100.0
12.700	1/2 in.	3.5	98.9	1.00	98.9
9.510	3/8 in.	3.5	98.9	1.00	98.9
4.760	#4	6.0	98.1	1.00	98.1
2.000	#10	11.4	96.3	1.00	96.3
0.850	#20	17.8	94.2	1.00	94.2
0.600	#30	20.5	93.3	1.00	93.3
0.425	#40	23.9	92.2	1.00	92.2
0.300	#50	28.7	90.6	1.00	90.6
0.250	#60	33.0	89.2	1.00	89.2
0.180	#80	46.2	84.9	1.00	84.9
0.150	#100	58.4	80.9	1.00	80.9
0.075	#200	112.5	63.2	1.00	63.2



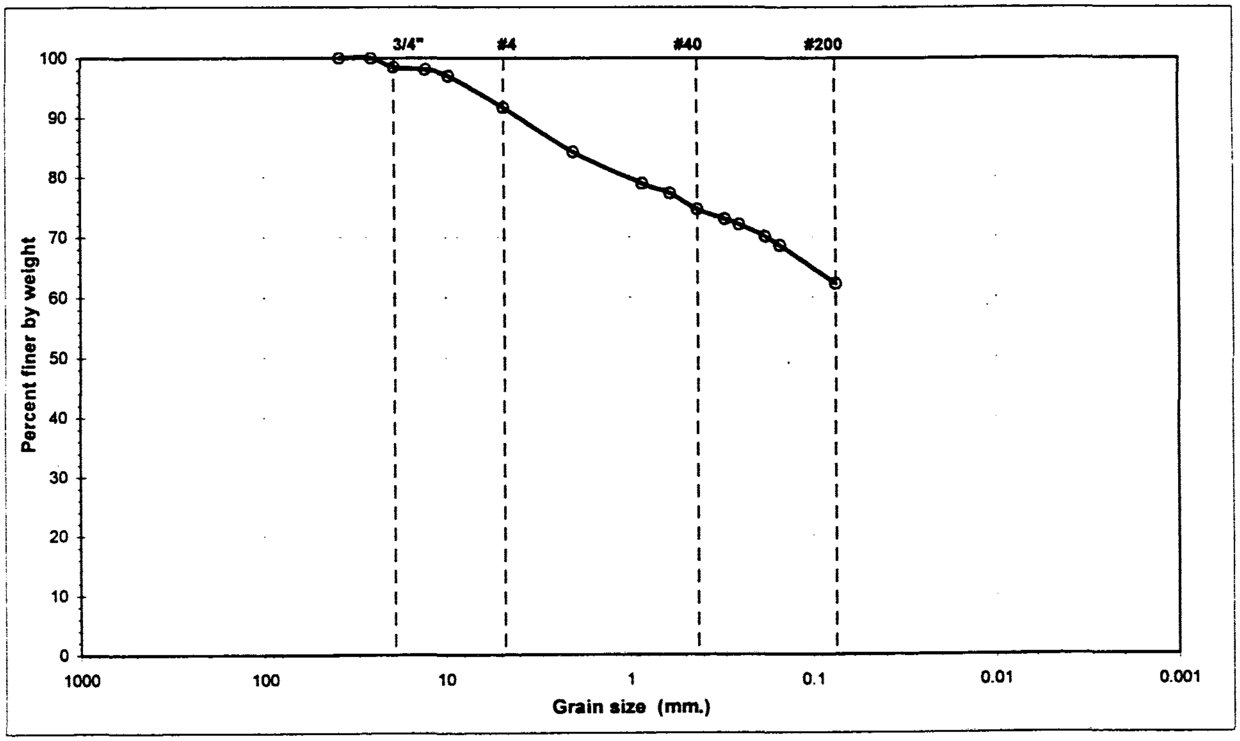
GRAIN SIZE ANALYSIS

STL # : –
Client : Santa Clara Valley Water District
Project : Thompson Creek
Sample ID : DH-1 S-2 @ 18-20 ft.
Date tested : 12-98
Tested by : BC
Soil : (CL)

(Total) Dish # -
Wt of Dry Soil + Dish (gm) = 1605.2
Dish Wt. (gm) = 0.0
Net Wt. (gm) = 1605.2

(-3/8") Dish # 911
Wt of Dry Soil + Dish (gm) = 899.0
Dish Wt. (gm) = 107.4
Net Wt. (gm) = 791.6

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	24.4	98.5	1.00	98.5
12.700	1/2 in.	3.0	99.6	0.98	98.1
9.510	3/8 in.	11.6	98.5	0.98	97.0
4.760	#4	54.6	93.1	0.98	91.7
2.000	#10	114.5	85.5	0.98	84.2
0.850	#20	157.5	80.1	0.98	78.9
0.600	#30	170.2	78.5	0.98	77.3
0.425	#40	183.3	76.8	0.97	74.6
0.300	#50	196.5	75.2	0.97	73.0
0.250	#60	204.0	74.2	0.97	72.0
0.180	#80	220.3	72.2	0.97	70.0
0.150	#100	232.7	70.6	0.97	68.5
0.075	#200	283.9	64.1	0.97	62.2

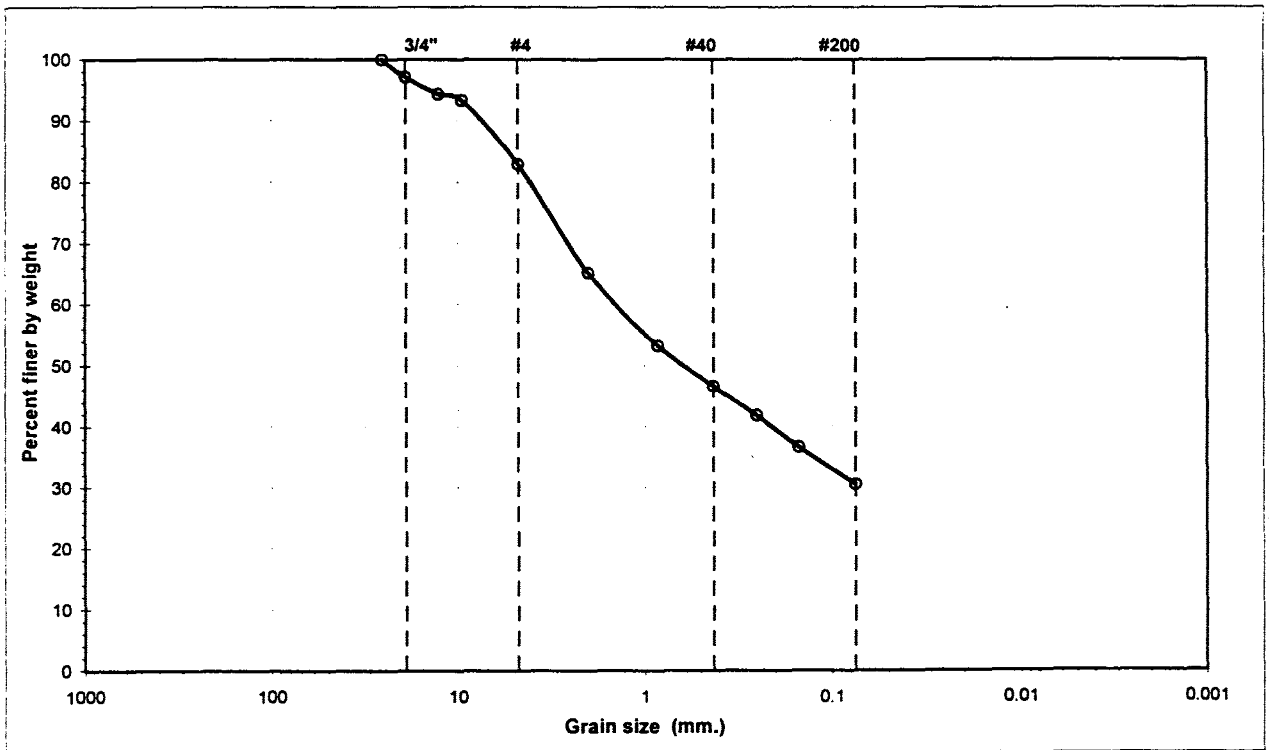


GRAIN SIZE ANALYSIS

Job # : 203444
Client :
Project : Thompson Creek
Sample ID : DH-1 B4 @ 28-29.5
Date tested : 12/2/98
Tested by : BC
Soil : Brown clay with gravel

Dish # AR2
Wt of Dry Soil + Dish (gm) = 495.1
Dish Wt. (gm) = 106.6
Net Wt. (gm) = 388.5

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	11.1	97.1	1.00	97.1
12.700	1/2 in.	21.9	94.4	1.00	94.4
9.510	3/8 in.	25.8	93.4	1.00	93.4
4.760	#4	66.3	82.9	1.00	82.9
2.000	#10	135.5	65.1	1.00	65.1
0.850	#20	181.6	53.3	1.00	53.3
0.425	#40	207.5	46.6	1.00	46.6
0.250	#60	226.0	41.8	1.00	41.8
0.150	#100	246.3	36.6	1.00	36.6
0.075	#200	270.1	30.5	1.00	30.5



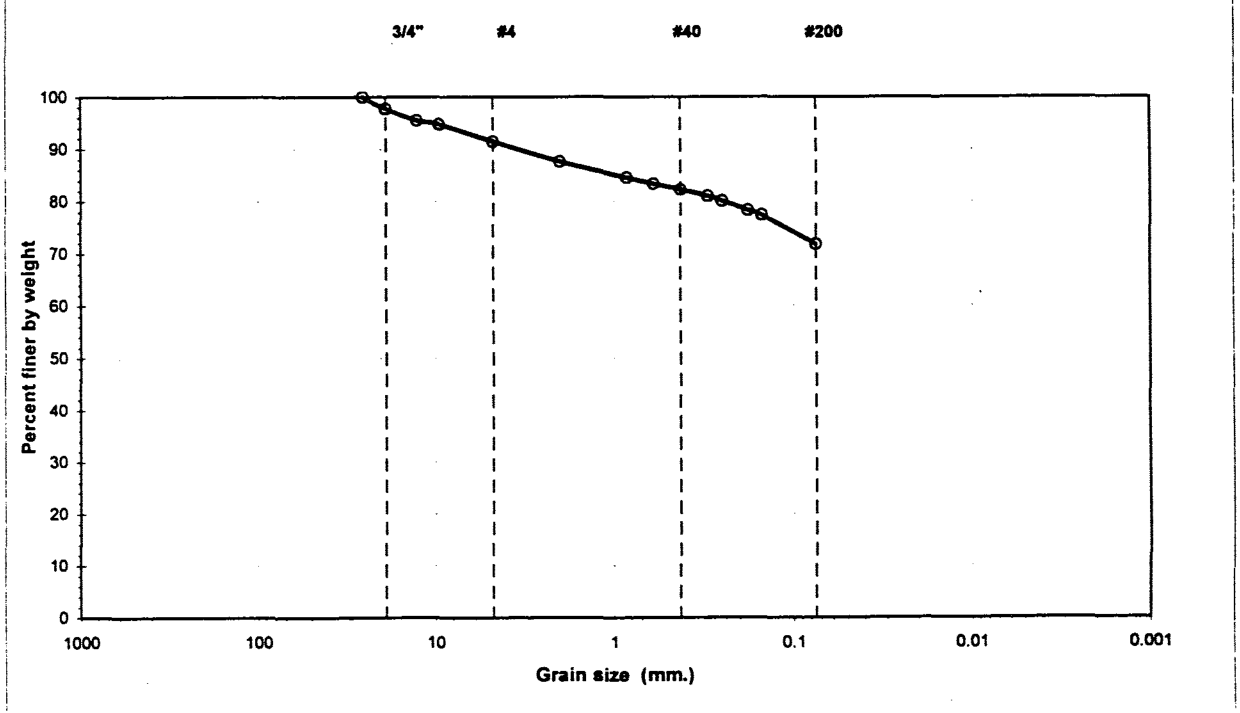
GRAIN SIZE ANALYSIS

STL # : --
Client : Santa Clara Valley Water District
Project : Thompson Creek
Sample ID : DH -2 S - 1 @ 5.6 - 7 ft.
Date tested : --
Tested by : --
Soil : (CL)

(Total) Dish # -
Wt of Dry Soil + Dish (gm) = 693.9
Dish Wt. (gm) = 0.0
Net Wt. (gm) = 693.9

(- 1/2") Dish # -
Wt of Dry Soil + Dish (gm) = 510.8
Dish Wt. (gm) = 0.0
Net Wt. (gm) = 510.8

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	16.0	97.7	1.00	97.7
12.700	1/2 in.	31.2	95.5	1.00	95.5
9.510	3/8 in.	4.1	99.2	0.96	94.7
4.760	#4	21.8	95.7	0.96	91.4
2.000	#10	42.3	91.7	0.96	87.6
0.850	#20	58.8	88.5	0.96	84.5
0.600	#30	65.1	87.3	0.96	83.3
0.425	#40	71.0	86.1	0.96	82.2
0.300	#50	77.5	84.8	0.96	81.0
0.250	#60	82.4	83.9	0.96	80.1
0.180	#80	92.2	81.9	0.96	78.3
0.150	#100	97.0	81.0	0.96	77.4
0.075	#200	127.0	75.1	0.96	71.8

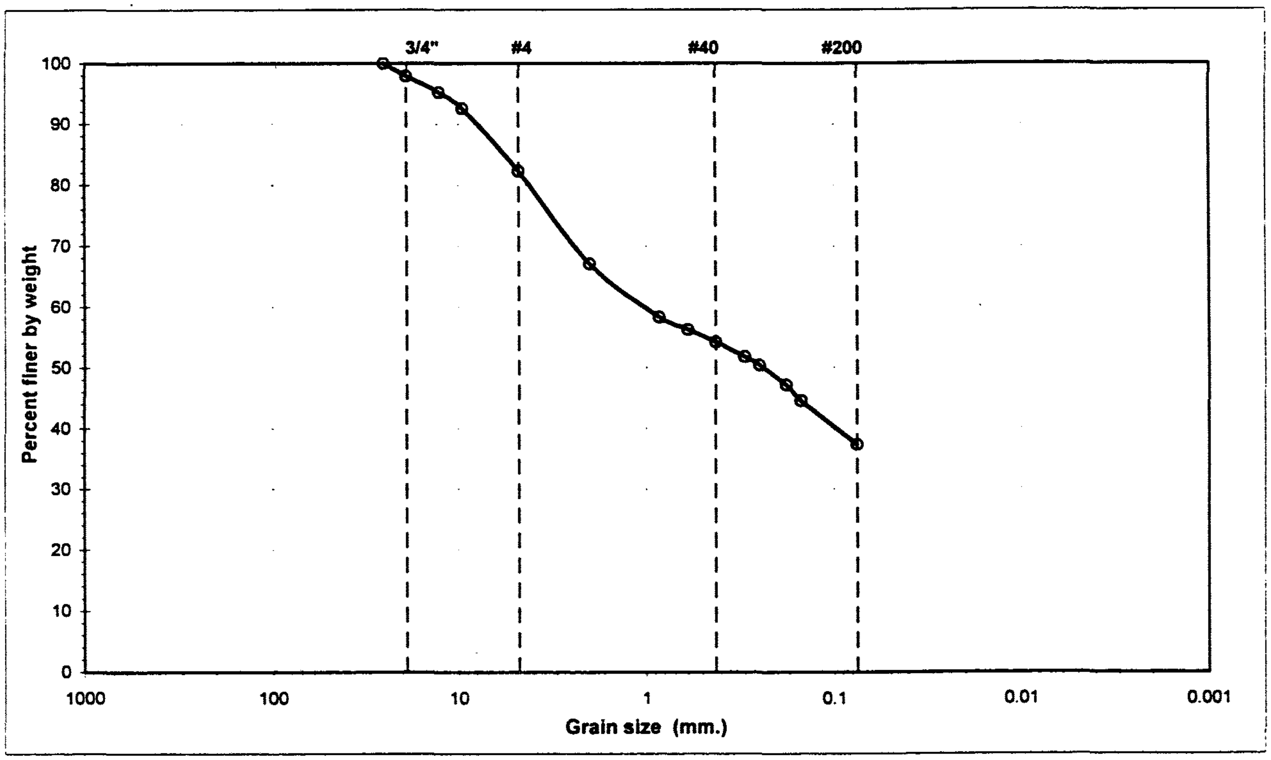


GRAIN SIZE ANALYSIS

Job # : --
Client : Santa Clara Valley Water District
Project : Thompson Creek
Sample ID : DH - 4 S-2 Depth 16 - 18 ft.
Date tested : 12/20/98
Tested by : WL
Soil : (SC) w/ gravel

Dish # EG3
Wt of Dry Soil + Dish (gm) = 1582.0
Dish Wt. (gm) = 166.0
Net Wt. (gm) = 1416.0

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	29.5	97.9	1.00	97.9
12.700	1/2 in.	67.6	95.2	1.00	95.2
9.510	3/8 in.	105.1	92.6	1.00	92.6
4.760	#4	249.7	82.4	1.00	82.4
2.000	#10	465.6	67.1	1.00	67.1
0.850	#20	589.4	58.4	1.00	58.4
0.600	#30	618.9	56.3	1.00	56.3
0.425	#40	648.5	54.2	1.00	54.2
0.300	#50	682.2	51.8	1.00	51.8
0.250	#60	702.0	50.4	1.00	50.4
0.180	#80	748.4	47.1	1.00	47.1
0.150	#100	785.3	44.5	1.00	44.5
0.075	#200	887.8	37.3	1.00	37.3

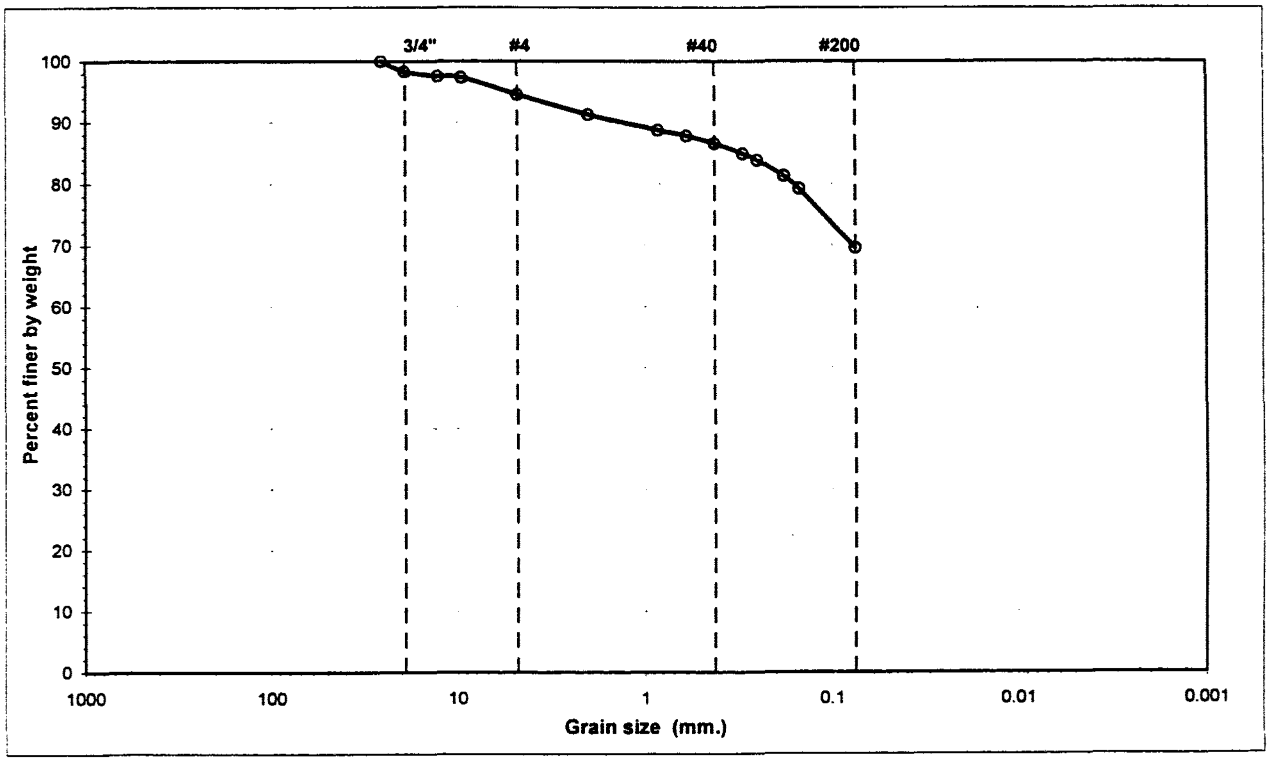


GRAIN SIZE ANALYSIS

Job # : --
Client : Santa Clara Valley Water District
Project : Thompson Creek
Sample ID : DH - 5 S-2 Depth 23 - 25 ft.
Date tested : 12/20/98
Tested by : WL
Soil : (CL)

Dish # EG8
Wt of Dry Soil + Dish (gm) = 796.0
Dish Wt. (gm) = 165.8
Net Wt. (gm) = 630.2

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	10.5	98.3	1.00	98.3
12.700	1/2 in.	15.2	97.6	1.00	97.6
9.510	3/8 in.	16.8	97.3	1.00	97.3
4.760	#4	34.2	94.6	1.00	94.6
2.000	#10	55.0	91.3	1.00	91.3
0.850	#20	71.1	88.7	1.00	88.7
0.600	#30	76.9	87.8	1.00	87.8
0.425	#40	84.5	86.6	1.00	86.6
0.300	#50	95.2	84.9	1.00	84.9
0.250	#60	102.0	83.8	1.00	83.8
0.180	#80	117.9	81.3	1.00	81.3
0.150	#100	130.9	79.2	1.00	79.2
0.075	#200	191.8	69.6	1.00	69.6

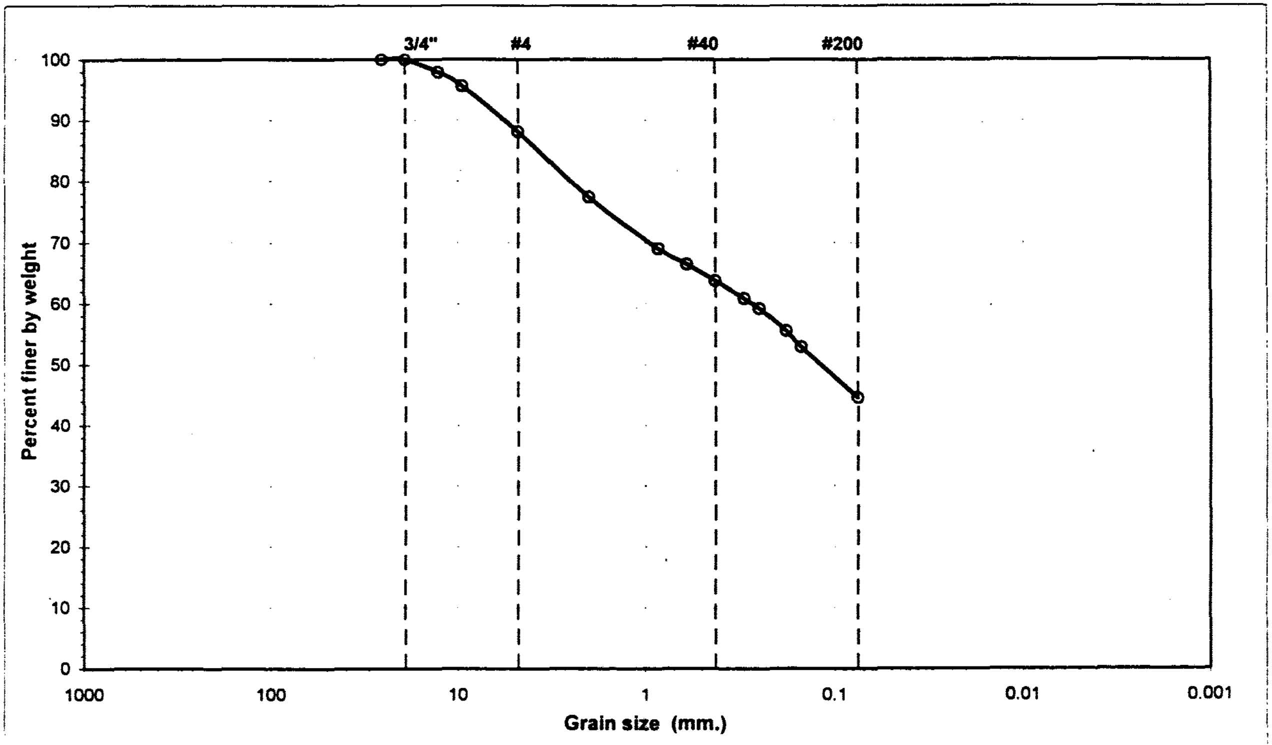


GRAIN SIZE ANALYSIS

Job # : –
Client : Santa Clara Valley Water District
Project : Thompson Creek
Sample ID : DH -6 L 1b Depth 6-6.5 ft.
Date tested : 12/21/98
Tested by : BC
Soil : (CL/SC) Dark brown sandy clay/clayey sand w/ trace gravel

Dish # 12
Wt of Dry Soil + Dish (gm) = 866.5
Dish Wt. (gm) = 296.0
Net Wt. (gm) = 570.5

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	0.0	100.0	1.00	100.0
12.700	1/2 in.	11.8	97.9	1.00	97.9
9.510	3/8 in.	24.8	95.7	1.00	95.7
4.760	#4	67.4	88.2	1.00	88.2
2.000	#10	128.7	77.4	1.00	77.4
0.850	#20	176.7	69.0	1.00	69.0
0.600	#30	191.2	66.5	1.00	66.5
0.425	#40	206.5	63.8	1.00	63.8
0.300	#50	223.5	60.8	1.00	60.8
0.250	#60	232.6	59.2	1.00	59.2
0.180	#80	253.5	55.6	1.00	55.6
0.150	#100	268.6	52.9	1.00	52.9
0.075	#200	316.2	44.6	1.00	44.6

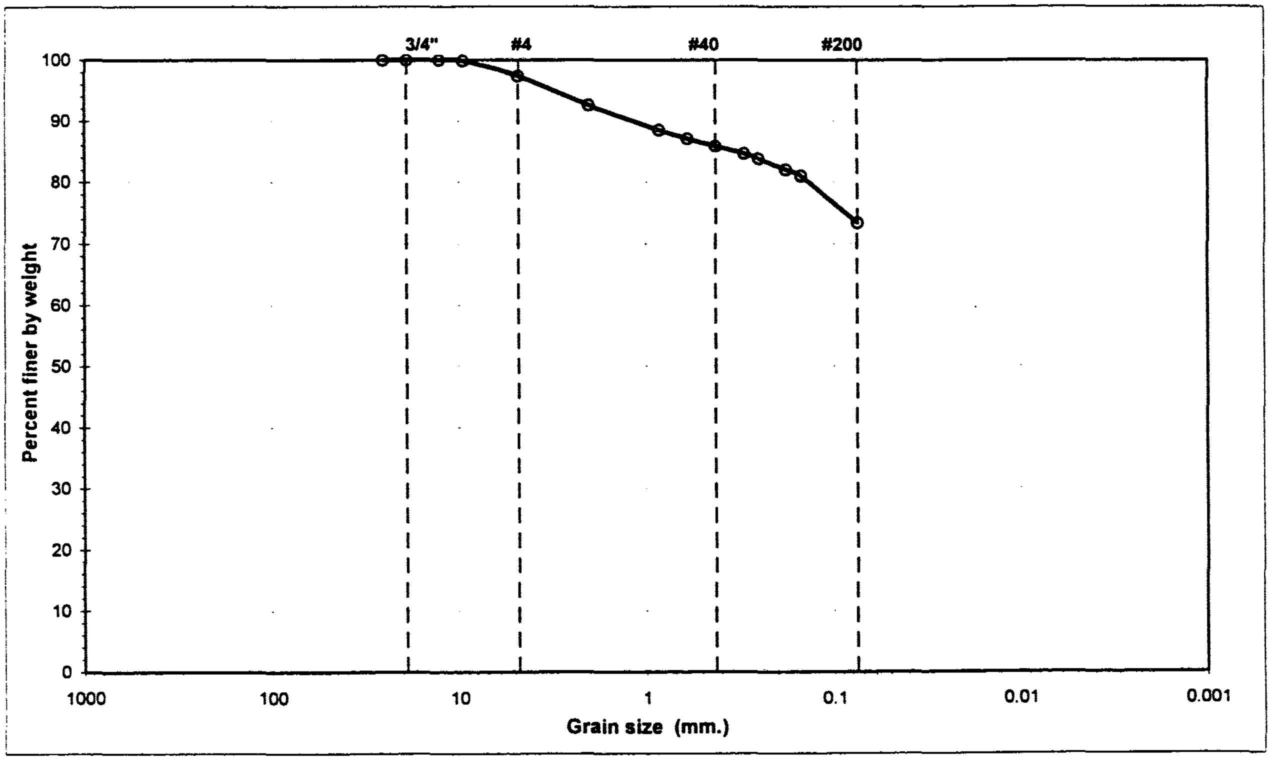


GRAIN SIZE ANALYSIS

Job # :	--
Client :	Santa Clara Valley Water District
Project :	Thompson Creek
Sample ID :	DH -6 S-1 Depth 10-12 ft.
Date tested :	12-98
Tested by :	BC
Soil :	(CL)

Dish #	915
Wt of Dry Soil + Dish (gm) =	1228.0
Dish Wt. (gm) =	112.2
Net Wt. (gm) =	1115.8

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	0.0	100.0	1.00	100.0
12.700	1/2 in.	0.0	100.0	1.00	100.0
9.510	3/8 in.	1.8	99.8	1.00	99.8
4.760	#4	29.4	97.4	1.00	97.4
2.000	#10	82.4	92.6	1.00	92.6
0.850	#20	128.1	88.5	1.00	88.5
0.600	#30	143.7	87.1	1.00	87.1
0.425	#40	157.4	85.9	1.00	85.9
0.300	#50	171.2	84.7	1.00	84.7
0.250	#60	180.2	83.9	1.00	83.9
0.180	#80	200.6	82.0	1.00	82.0
0.150	#100	212.0	81.0	1.00	81.0
0.075	#200	297.3	73.4	1.00	73.4

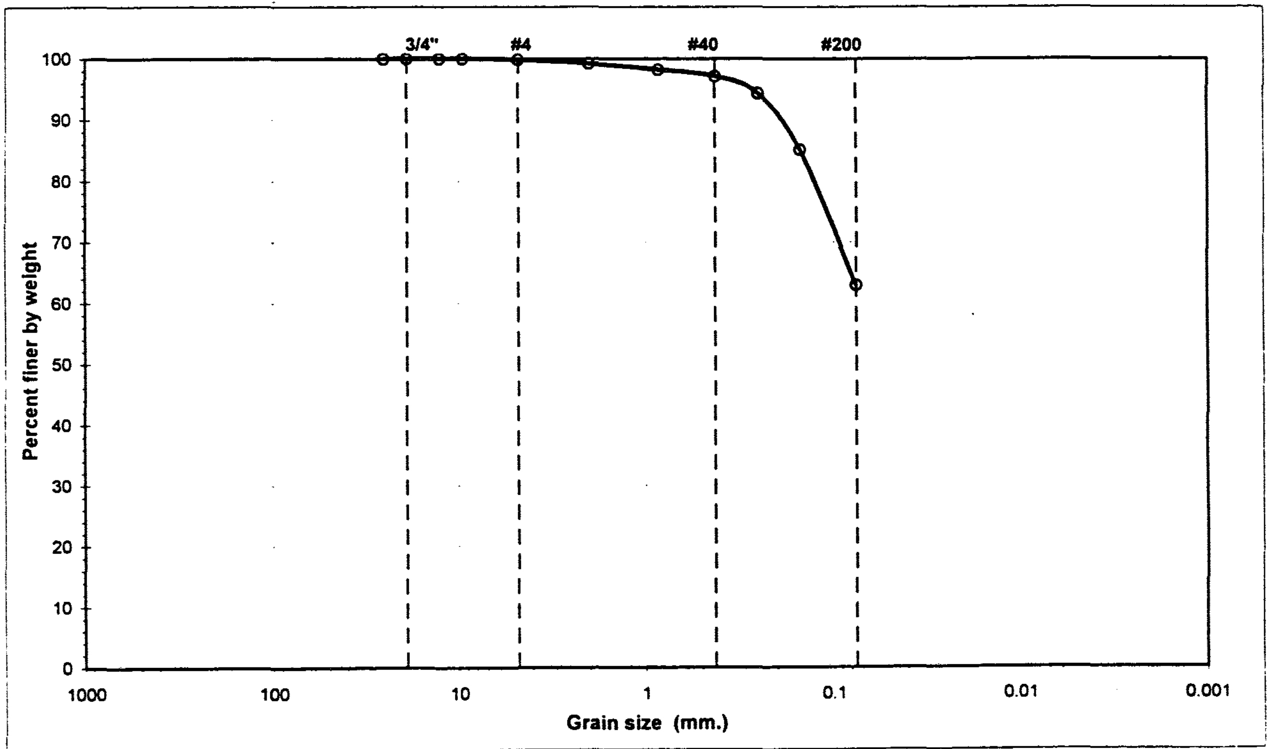


GRAIN SIZE ANALYSIS

Job # : 203444
Client :
Project : Thompson Creek
Sample ID : DH-6 B6 @30-31.5
Date tested : 12/2/98
Tested by : BC
Soil : Tan sand (silty)

Dish # WLT
Wt of Dry Soil + Dish (gm) = 536.4
Dish Wt. (gm) = 109.1
Net Wt. (gm) = 427.3

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	0.0	100.0	1.00	100.0
12.700	1/2 in.	0.0	100.0	1.00	100.0
9.510	3/8 in.	0.0	100.0	1.00	100.0
4.760	#4	0.7	99.8	1.00	99.8
2.000	#10	3.5	99.2	1.00	99.2
0.850	#20	7.6	98.2	1.00	98.2
0.425	#40	12.2	97.2	1.00	97.2
0.250	#60	24.0	94.4	1.00	94.4
0.150	#100	63.6	85.1	1.00	85.1
0.075	#200	158.2	63.0	1.00	63.0



Signet Testing Labs

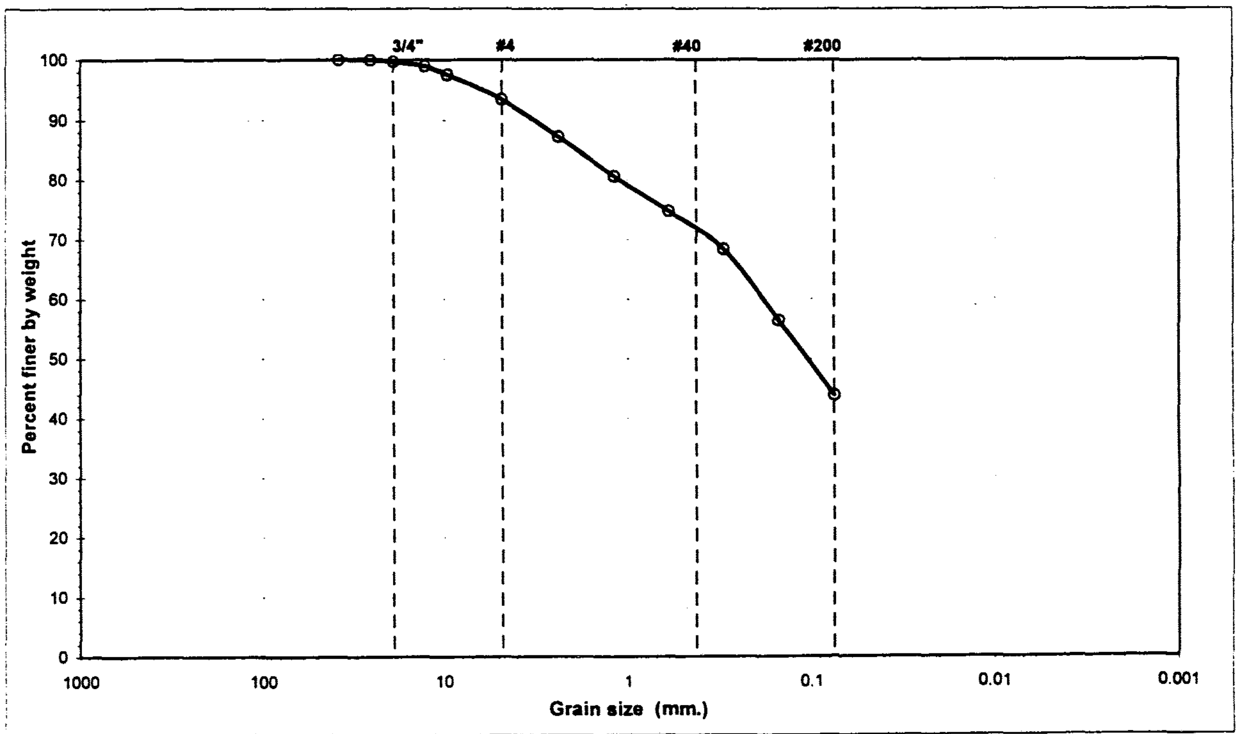
GRAIN SIZE ANALYSIS

STL # : –
Client : Santa Clara Valley Water District
Project : Thompson Creek
Sample ID : DH -6 BK-3
Date tested : 11/24/98
Tested by : –
Soil : –

(Total) Dish # -
Wt of Dry Soil + Dish (gm) = 10145.0
Dish Wt. (gm) = 0.0
Net Wt. (gm) = 10145.0

(- #4) Dish # -
Wt of Dry Soil + Dish (gm) = 519.8
Dish Wt. (gm) = 0.0
Net Wt. (gm) = 519.8

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	35.0	99.7	1.00	99.7
12.700	1/2 in.	110.0	98.9	1.00	98.9
9.510	3/8 in.	253.0	97.5	1.00	97.5
4.760	#4	670.0	93.4	1.00	93.4
2.360	#8	34.3	93.4	0.93	87.2
1.180	#16	71.1	86.3	0.93	80.6
0.600	#30	103.8	80.0	0.93	74.7
0.300	#50	139.5	73.2	0.93	68.3
0.150	#100	206.2	60.3	0.93	56.3
0.075	#200	276.0	46.9	0.93	43.8

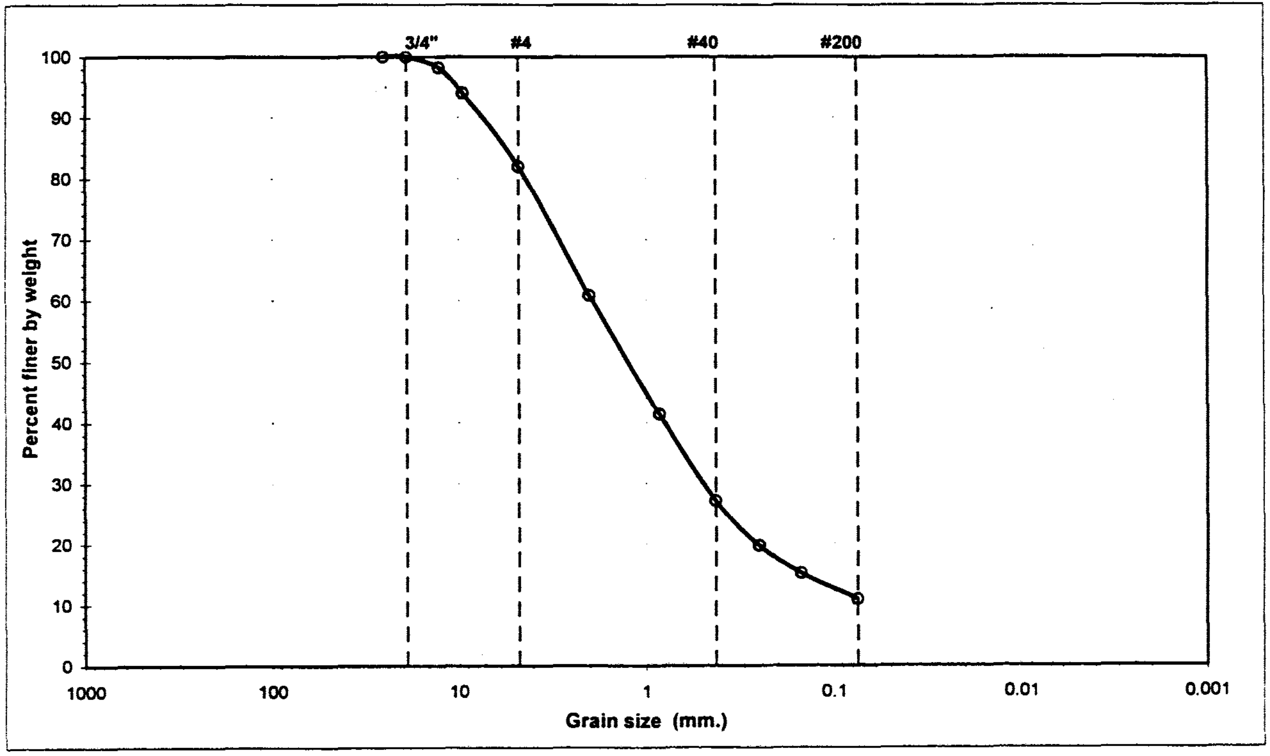


GRAIN SIZE ANALYSIS

Job # : 203444
Client :
Project : Thompson creek
Sample ID : DH-7 B5 @ 30-35.5
Date tested : 12/2/98
Tested by : BC
Soil : Gray silt & sand with gravel

Dish # 918
Wt of Dry Soil + Dish (gm) = 831.4
Dish Wt. (gm) = 109.0
Net Wt. (gm) = 722.4

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	0.0	100.0	1.00	100.0
12.700	1/2 in.	12.5	98.3	1.00	98.3
9.510	3/8 in.	43.1	94.0	1.00	94.0
4.760	#4	130.3	82.0	1.00	82.0
2.000	#10	282.8	60.8	1.00	60.8
0.850	#20	423.1	41.4	1.00	41.4
0.425	#40	526.5	27.1	1.00	27.1
0.250	#60	579.9	19.7	1.00	19.7
0.150	#100	612.9	15.2	1.00	15.2
0.075	#200	643.6	10.9	1.00	10.9

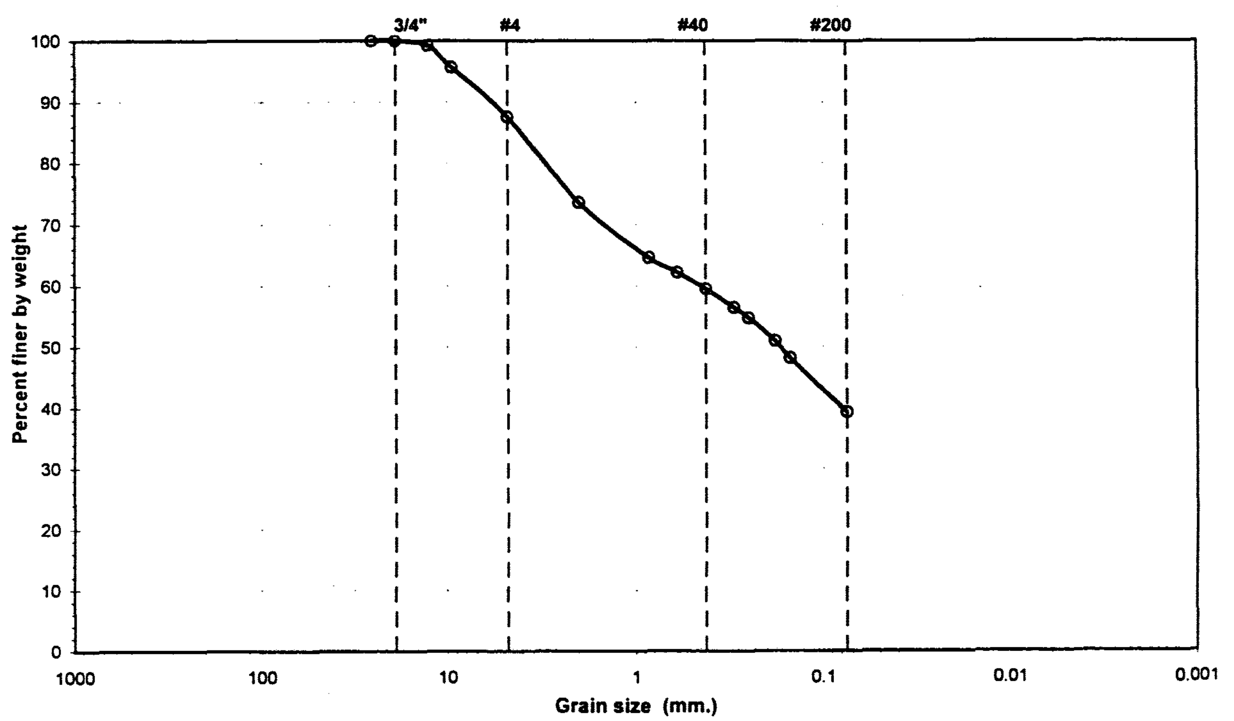


GRAIN SIZE ANALYSIS

Job # :	–
Client :	Santa Clara Valley Water District
Project :	Thompson Creek
Sample ID :	DH -10 L 2b Depth 5-5.5 ft.
Date tested :	12/21/98
Tested by :	BC
Soil :	(SC) Dark brown clayey sand w/ trace gravel

Dish # 911
Wt of Dry Soil + Dish (gm) = 587.9
Dish Wt. (gm) = 107.2
Net Wt. (gm) = 480.7

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	0.0	100.0	1.00	100.0
12.700	1/2 in.	3.5	99.3	1.00	99.3
9.510	3/8 in.	20.5	95.7	1.00	95.7
4.760	#4	59.4	87.6	1.00	87.6
2.000	#10	127.1	73.6	1.00	73.6
0.850	#20	170.2	64.6	1.00	64.6
0.600	#30	182.0	62.1	1.00	62.1
0.425	#40	194.9	59.5	1.00	59.5
0.300	#50	209.6	56.4	1.00	56.4
0.250	#60	217.8	54.7	1.00	54.7
0.180	#80	235.9	50.9	1.00	50.9
0.150	#100	249.2	48.2	1.00	48.2
0.075	#200	291.6	39.3	1.00	39.3

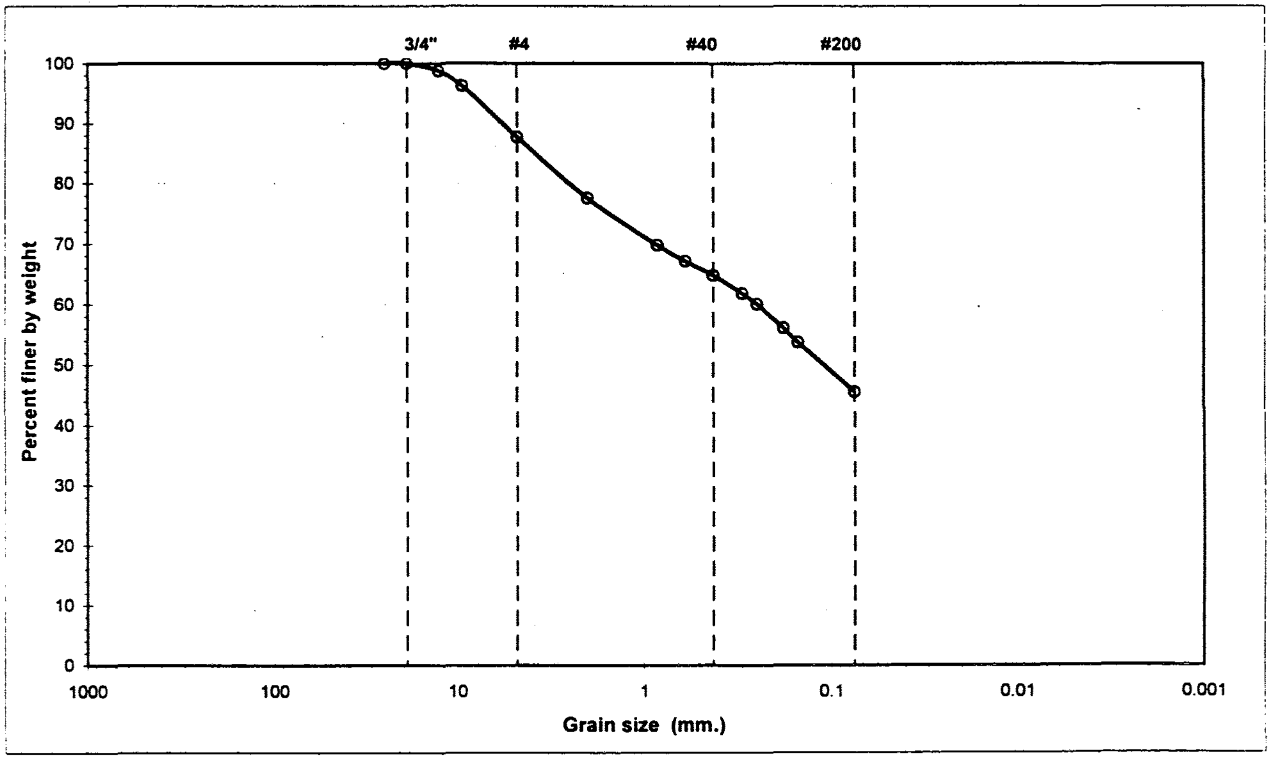


GRAIN SIZE ANALYSIS

Job # : --
Client : Santa Clara Valley Water District
Project : Thompson Creek
Sample ID : DH -10 S-1 Depth 6-8 ft.
Date tested : 12/5/98
Tested by : YD
Soil : (CL) Dark brown sandy clay w/ trace gravel

Dish # EG6
Wt of Dry Soil + Dish (gm) = 1053.0
Dish Wt. (gm) = 0.0
Net Wt. (gm) = 1053.0

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	0.0	100.0	1.00	100.0
12.700	1/2 in.	13.1	98.8	1.00	98.8
9.510	3/8 in.	39.2	96.3	1.00	96.3
4.760	#4	128.8	87.8	1.00	87.8
2.000	#10	236.1	77.6	1.00	77.6
0.850	#20	317.6	69.8	1.00	69.8
0.600	#30	345.5	67.2	1.00	67.2
0.425	#40	370.3	64.8	1.00	64.8
0.300	#50	402.1	61.8	1.00	61.8
0.250	#60	420.6	60.1	1.00	60.1
0.180	#80	462.6	56.1	1.00	56.1
0.150	#100	487.2	53.7	1.00	53.7
0.075	#200	573.4	45.5	1.00	45.5

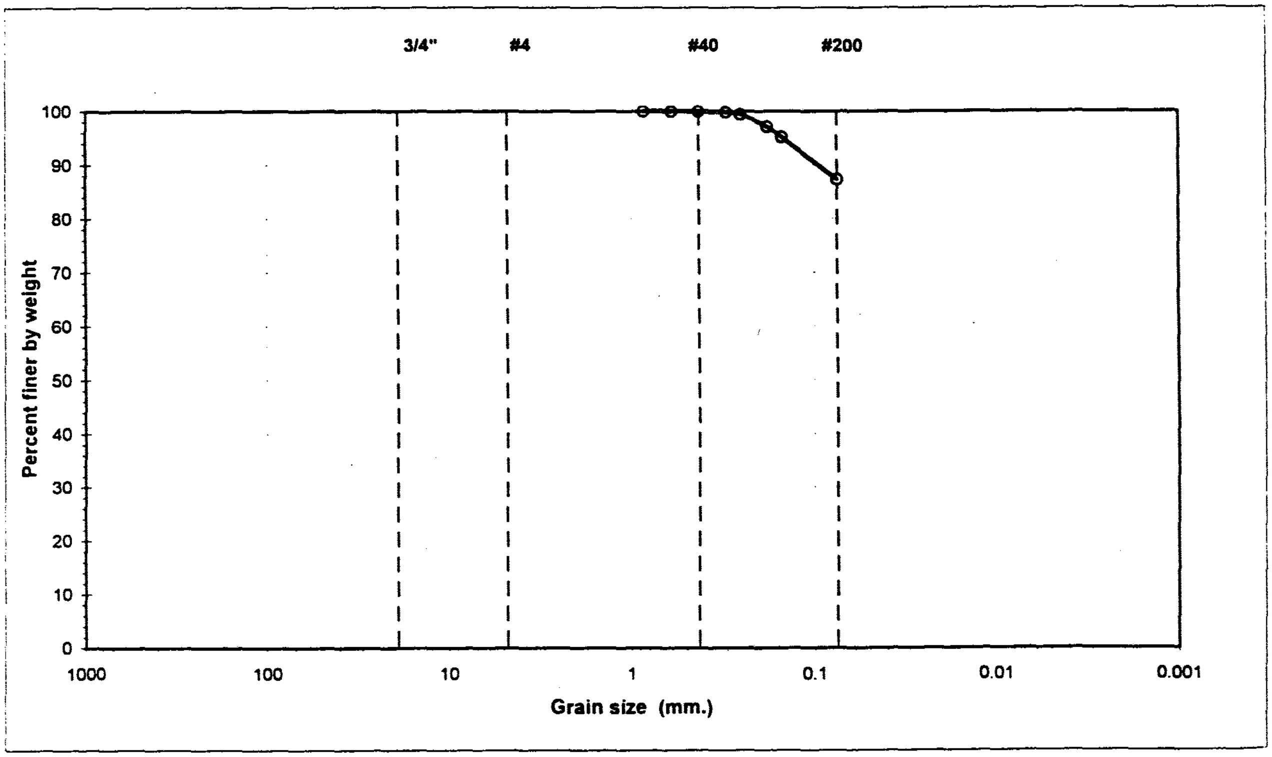


GRAIN SIZE ANALYSIS

Job # : –
Client : Santa Clara Valley Water District
Project : Thompson Creek
Sample ID : DH -10 S-3 Depth 13.5 - 15 ft.
Date tested : 12/15/98
Tested by : BC
Soil : CL

Dish # AR3
Wt of Dry Soil + Dish (gm) = 1019.7
Dish Wt. (gm) = 110.2
Net Wt. (gm) = 909.5

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	0.0	100.0	1.00	100.0
12.700	1/2 in.	0.0	100.0	1.00	100.0
9.510	3/8 in.	0.0	100.0	1.00	100.0
4.760	#4	0.0	100.0	1.00	100.0
2.000	#10	0.0	100.0	1.00	100.0
0.850	#20	0.0	100.0	1.00	100.0
0.600	#30	0.1	100.0	1.00	100.0
0.425	#40	0.4	100.0	1.00	100.0
0.300	#50	1.8	99.8	1.00	99.8
0.250	#60	5.7	99.4	1.00	99.4
0.180	#80	25.9	97.2	1.00	97.2
0.150	#100	43.5	95.2	1.00	95.2
0.075	#200	115.7	87.3	1.00	87.3

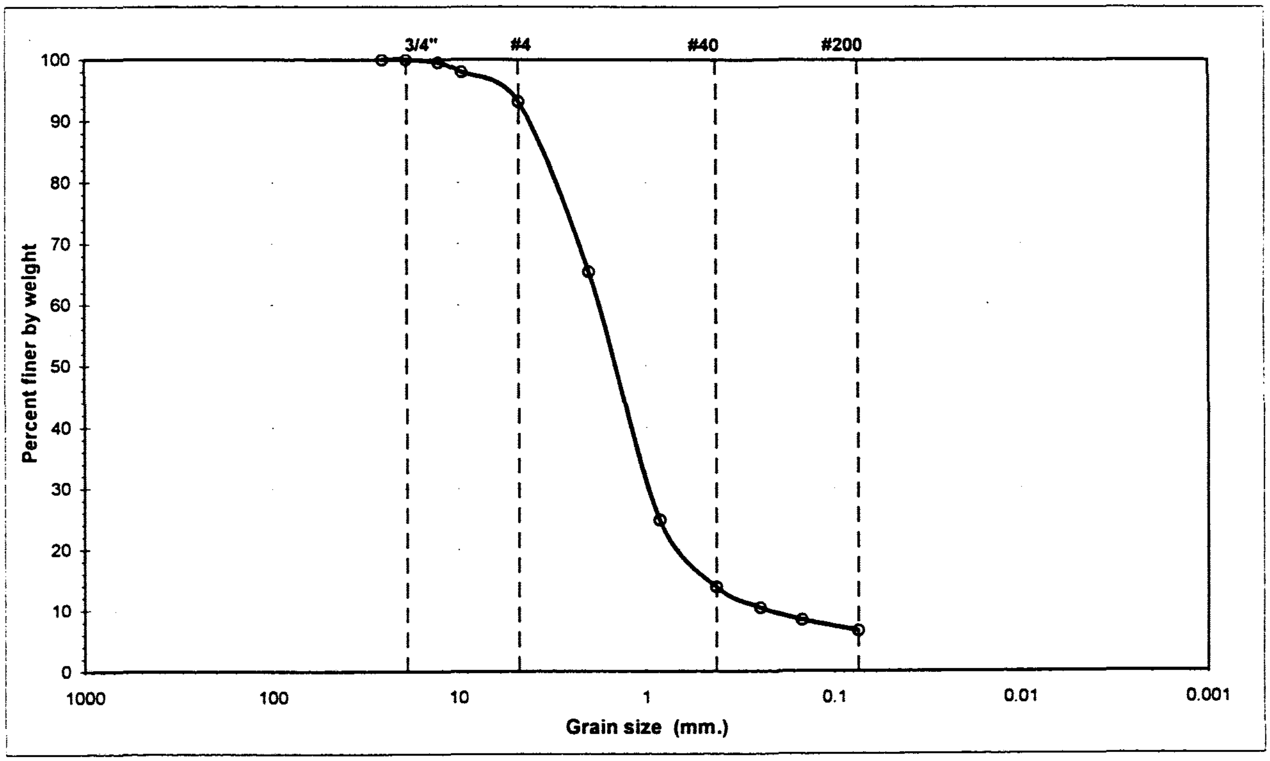


GRAIN SIZE ANALYSIS

Job # : 203444
Client :
Project : Thompson creek
Sample ID : DH-10 B3 @ 25-26.5
Date tested : 12/2/98
Tested by : BC
Soil : Tan sand with gravel

Dish # 935
Wt of Dry Soil + Dish (gm) = 736.9
Dish Wt. (gm) = 110.9
Net Wt. (gm) = 626.0

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	0.0	100.0	1.00	100.0
12.700	1/2 in.	2.9	99.5	1.00	99.5
9.510	3/8 in.	12.6	98.0	1.00	98.0
4.760	#4	43.1	93.1	1.00	93.1
2.000	#10	216.7	65.4	1.00	65.4
0.850	#20	470.9	24.8	1.00	24.8
0.425	#40	539.4	13.8	1.00	13.8
0.250	#60	560.9	10.4	1.00	10.4
0.150	#100	573.4	8.4	1.00	8.4
0.075	#200	584.6	6.6	1.00	6.6



Signet Testing Labs

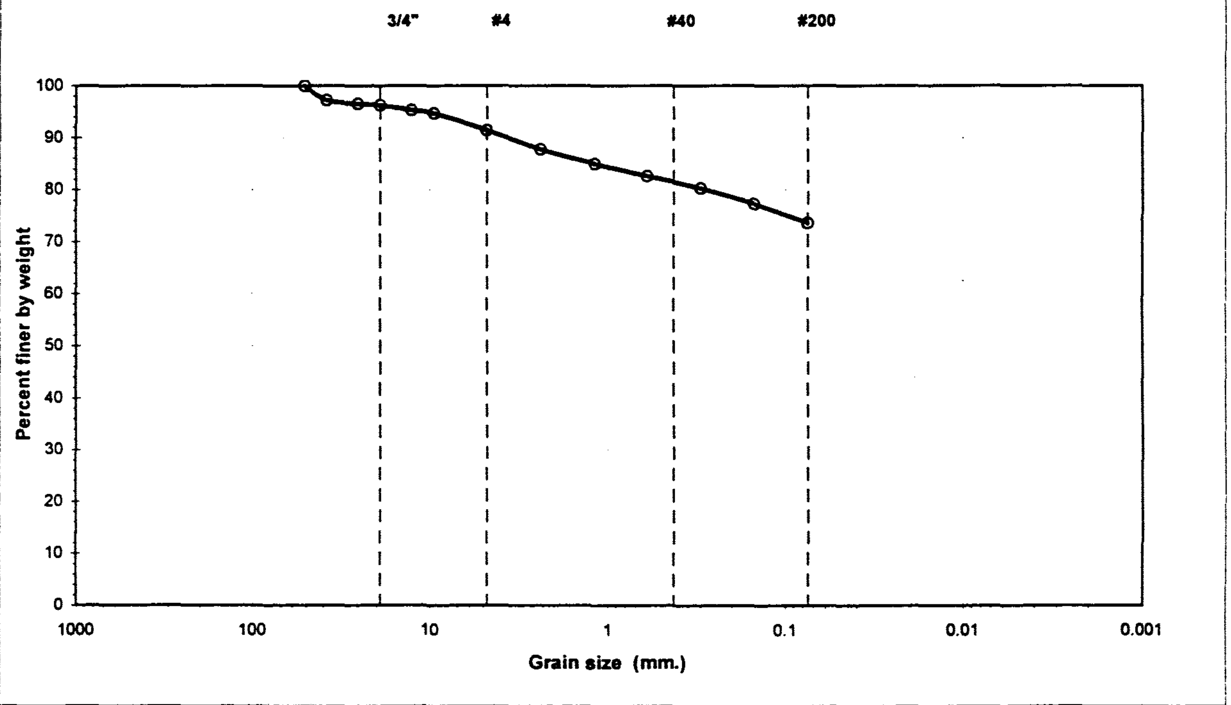
GRAIN SIZE ANALYSIS

STL # : –
Client : Santa Clara Valley Water District
Project : Thompson Creek
Sample ID : DH -10 BK-2
Date tested : 12/2/98
Tested by : –
Soil : –

(Total) Dish # -
Wt of Dry Soil + Dish (gm) = 7489.0
Dish Wt. (gm) = 0.0
Net Wt. (gm) = 7489.0

(- #4) Dish # -
Wt of Dry Soil + Dish (gm) = 528.6
Dish Wt. (gm) = 0.0
Net Wt. (gm) = 528.6

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	209.0	97.2	1.00	97.2
25.400	1 in.	260.0	96.5	1.00	96.5
19.000	3/4 in.	282.0	96.2	1.00	96.2
12.700	1/2 in.	350.0	95.3	1.00	95.3
9.510	3/8 in.	399.0	94.7	1.00	94.7
4.760	#4	643.0	91.4	1.00	91.4
2.360	#8	21.3	96.0	0.91	87.7
1.180	#16	37.4	92.9	0.91	84.9
0.600	#30	50.8	90.4	0.91	82.6
0.300	#50	64.5	87.8	0.91	80.3
0.150	#100	81.7	84.5	0.91	77.3
0.075	#200	102.7	80.6	0.91	73.7



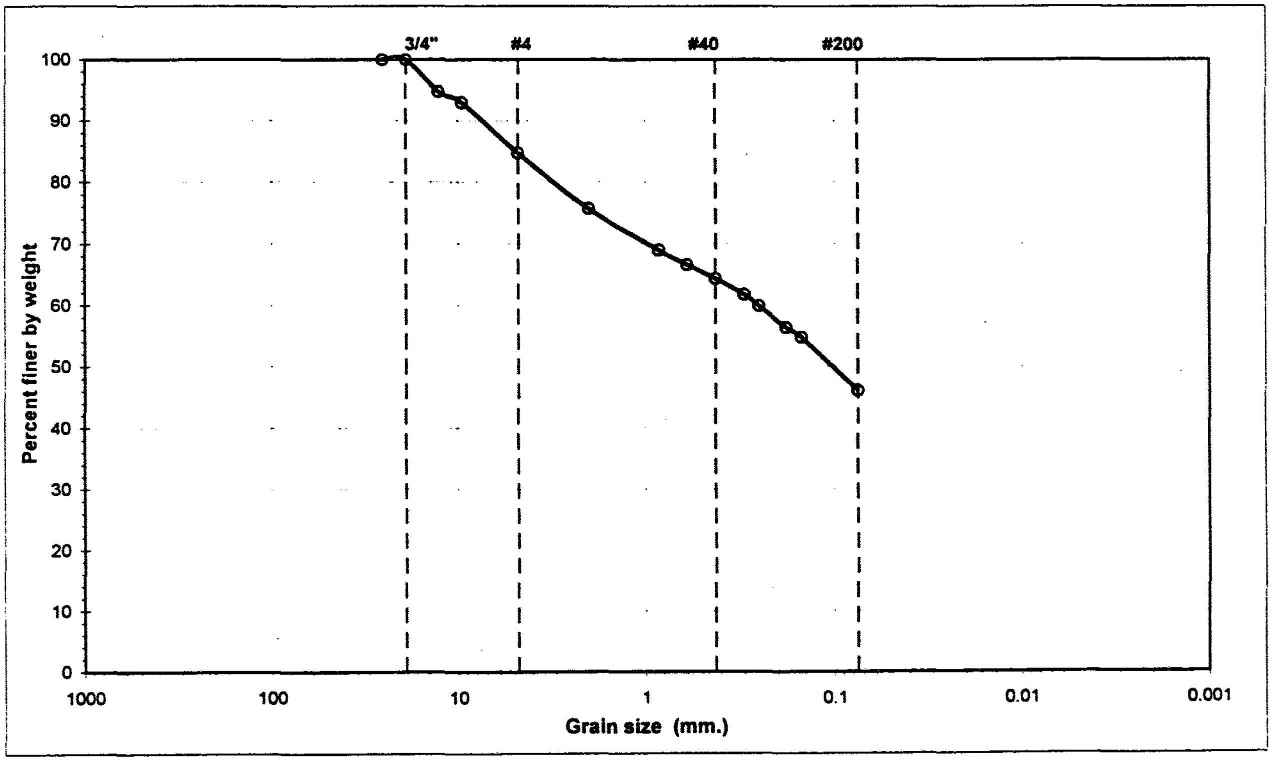
Signet Testing Labs

GRAIN SIZE ANALYSIS

Job # : –
Client : Santa Clara Valley Water District
Project : Thompson Creek
Sample ID : DH -11 L1b Depth 3-3.5 ft.
Date tested : 12-98
Tested by : BC
Soil : (CL) Dark brown sandy clay w/ trace gravel

Dish # 918
Wt of Dry Soil + Dish (gm) = 758.5
Dish Wt. (gm) = 109.2
Net Wt. (gm) = 649.3

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	0.0	100.0	1.00	100.0
12.700	1/2 in.	34.4	94.7	1.00	94.7
9.510	3/8 in.	45.6	93.0	1.00	93.0
4.760	#4	98.8	84.8	1.00	84.8
2.000	#10	157.7	75.7	1.00	75.7
0.850	#20	201.3	69.0	1.00	69.0
0.600	#30	216.8	66.6	1.00	66.6
0.425	#40	231.8	64.3	1.00	64.3
0.300	#50	248.5	61.7	1.00	61.7
0.250	#60	260.5	59.9	1.00	59.9
0.180	#80	283.5	56.3	1.00	56.3
0.150	#100	293.8	54.8	1.00	54.8
0.075	#200	350.3	46.0	1.00	46.0

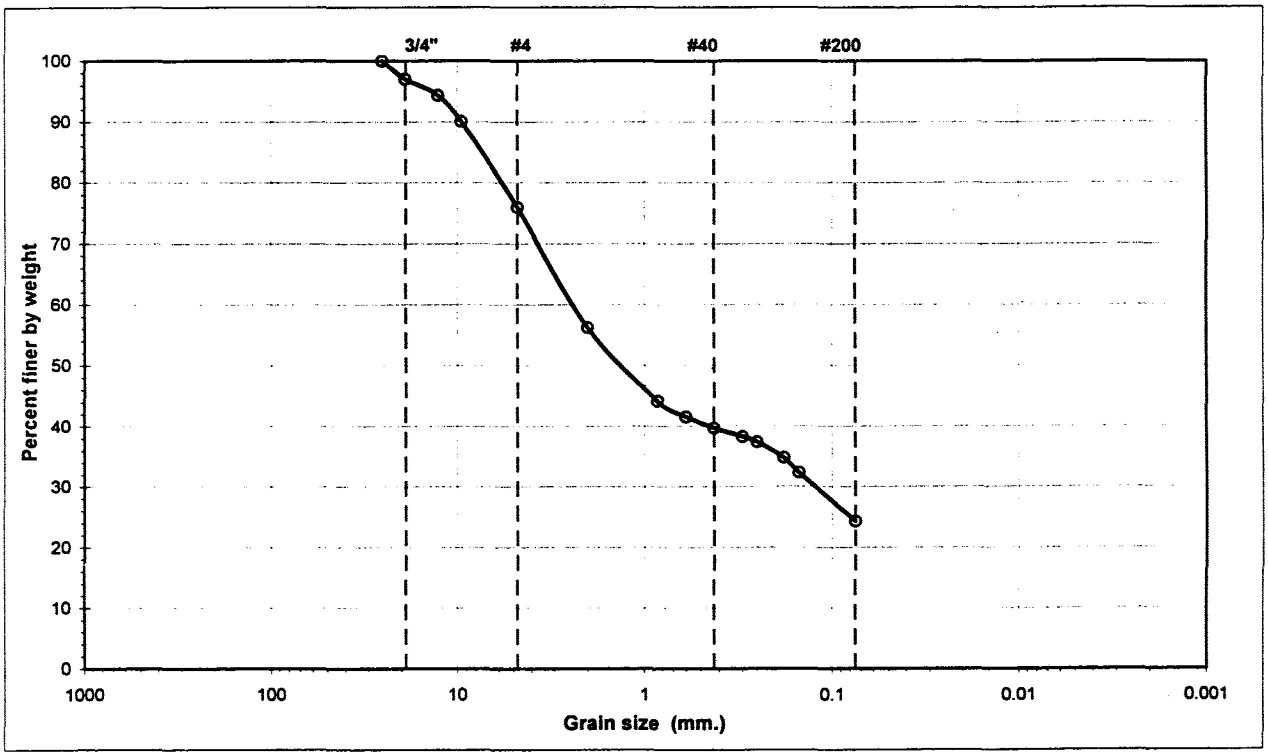


GRAIN SIZE ANALYSIS

Job # : --
Client : Santa Clara Valley Water District
Project : Thompson Creek
Sample ID : DH -11 L3b Depth 11-11.5 ft.
Date tested : 12/5/98
Tested by : WL
Soil : (SC) Dark brown clayey sand w/ trace gravel

Dish # MLF4
Wt of Dry Soil + Dish (gm) = 894.4
Dish Wt. (gm) = 168.2
Net Wt. (gm) = 726.2

Sieve Opening (mm)	Sieve Size	Cumulative Wt. Retained (gm)	Cumulative % Passing (%)	Correction Factor	Corrected Cumulative % Passing
76.100	3 in.	0.0	100.0	1.00	100.0
50.800	2 in.	0.0	100.0	1.00	100.0
38.100	1.5 in.	0.0	100.0	1.00	100.0
25.400	1 in.	0.0	100.0	1.00	100.0
19.000	3/4 in.	21.4	97.1	1.00	97.1
12.700	1/2 in.	40.7	94.4	1.00	94.4
9.510	3/8 in.	71.8	90.1	1.00	90.1
4.760	#4	174.4	76.0	1.00	76.0
2.000	#10	317.7	56.2	1.00	56.2
0.850	#20	405.3	44.2	1.00	44.2
0.600	#30	424.6	41.5	1.00	41.5
0.425	#40	437.9	39.7	1.00	39.7
0.300	#50	448.2	38.3	1.00	38.3
0.250	#60	454.4	37.4	1.00	37.4
0.180	#80	473.4	34.8	1.00	34.8
0.150	#100	491.3	32.3	1.00	32.3
0.075	#200	549.7	24.3	1.00	24.3



ATTERBERG LIMITS

Atterberg Limits - ASTM D4318

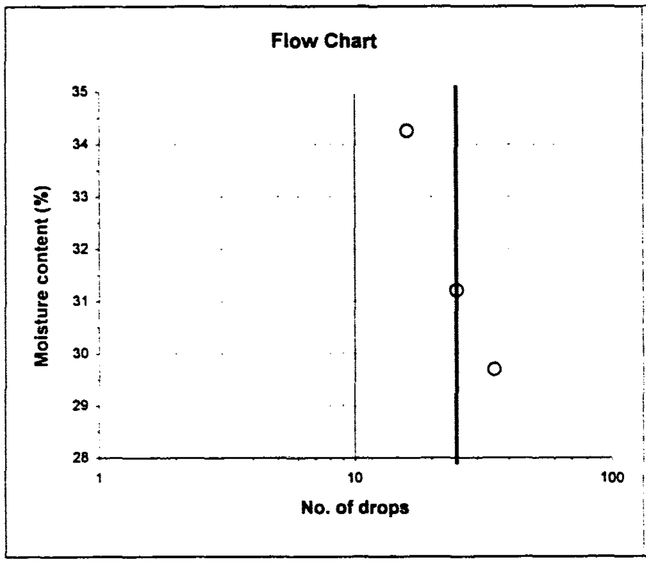
Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 1
Sample # : S-1
Depth (ft) : 8.5 - 10
Date tested : 12/15/98
Tested by : YD
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

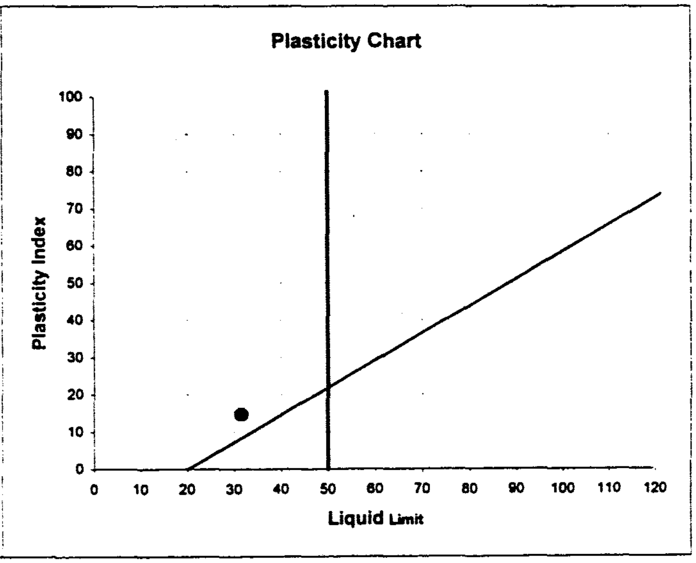
Plastic Limit

Wet wt. of soil + dish wt. (gm)	25.68	
Dry wt. of soil + dish wt. (gm)	24.83	
Wt. of dish (gm)	19.77	
Dish ID	R	
Moisture Content (%)	16.8	

Liquid Limit

						Moisture As rec'd
Wet wt. of soil + dish wt. (gm)	36.44	33.65	34.30			
Dry wt. of soil + dish wt. (gm)	32.55	29.94	30.91			
Wt. of dish (gm)	20.10	19.10	19.50			
Dish ID	O	P	Q			
Number of drops	25	16	35			–
Moisture Content (%)	31.2	34.3	29.7			
LL	31.2	32.5	30.9			–





Result: **LL = 31.5** **PL = 16.8** **PI = 14.7** **CL**

Atterberg Limits - ASTM D4318

Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 1
Sample # : S-2
Depth (ft) : 18-20
Date tested : 12/12/98
Tested by : YD
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

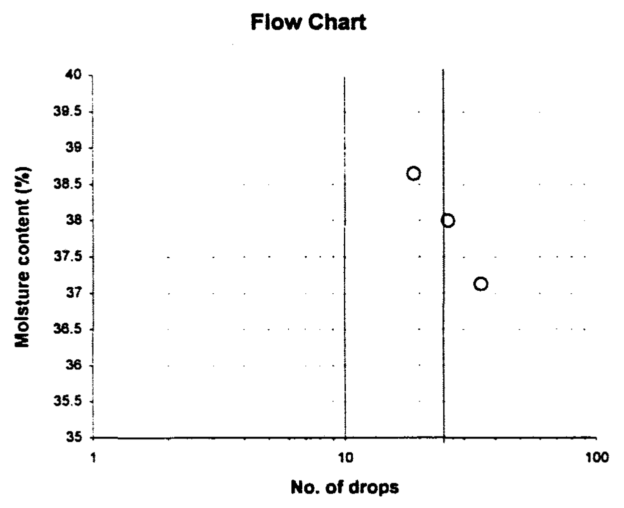
Plastic Limit

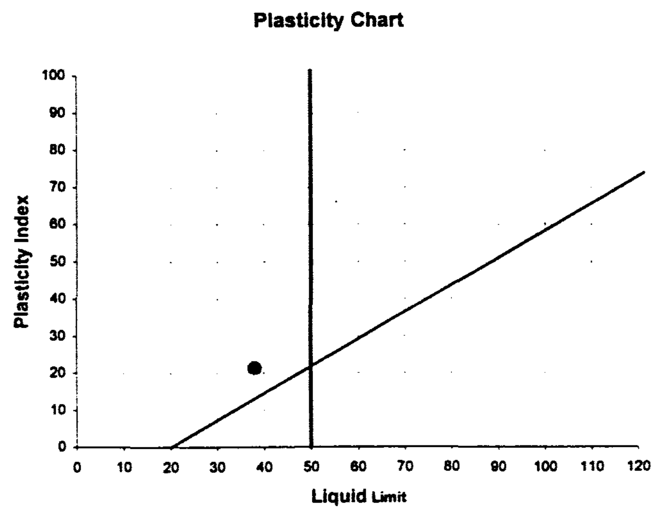
Wet wt. of soil + dish wt. (gm)	25.73	
Dry wt. of soil + dish wt. (gm)	24.80	
Wt. of dish (gm)	19.25	
Dish ID	X	
Moisture Content (%)	16.7	

Liquid Limit

Wet wt. of soil + dish wt. (gm)	34.96	34.81	34.56		
Dry wt. of soil + dish wt. (gm)	30.66	30.72	30.56		
Wt. of dish (gm)	19.52	19.96	19.78		
Dish ID	U	V	W		
Number of drops	19	26	35		
Moisture Content (%)	38.6	38.0	37.1		
LL	37.4	38.2	38.7		

Moisture As rec'd
–
–





Result: **LL = 38.1** **PL = 16.7** **PI = 21.4** **CL**

Atterberg Limits - ASTM D4318

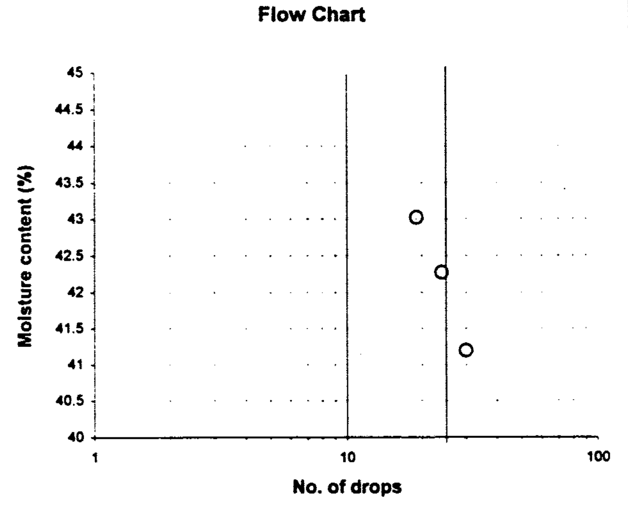
Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : --
Boring # : DH - 2
Sample # : S-1
Depth (ft) : 5.6-7
Date tested : 12/12/98
Tested by : YD
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

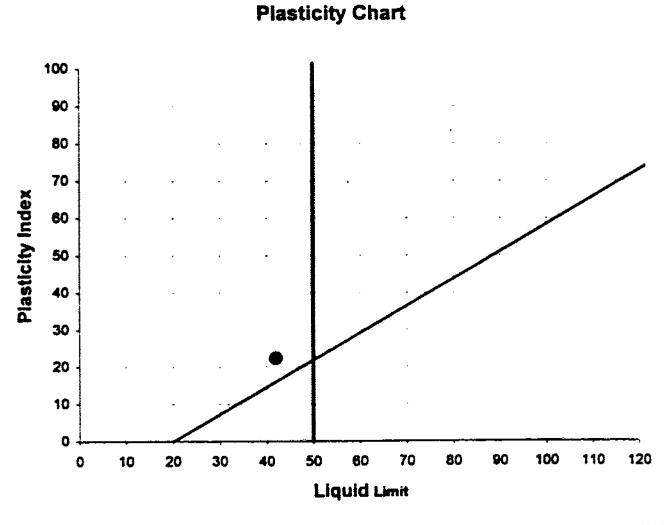
Plastic Limit

Wet wt. of soil + dish wt. (gm)	24.08	
Dry wt. of soil + dish wt. (gm)	23.39	
Wt. of dish (gm)	19.85	
Dish ID	D	
Moisture Content (%)	19.6	

Liquid Limit

						Moisture As rec'd
Wet wt. of soil + dish wt. (gm)	33.31	33.73	34.82			
Dry wt. of soil + dish wt. (gm)	29.11	29.43	30.39			
Wt. of dish (gm)	19.35	19.26	19.64			
Dish ID	A	B	C			
Number of drops	19	24	30			--
Moisture Content (%)	43.0	42.3	41.2			
LL	41.6	42.1	42.1			--


Flow Chart


Plasticity Chart

Result: **LL = 41.9** **PL = 19.6** **PI = 22.4** **CL**

Atterberg Limits - ASTM D4318

Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : --
Boring # : DH - 2
Sample # : S-2
Depth (ft) : 12 - 14
Date tested : 12/16/98
Tested by : YD
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

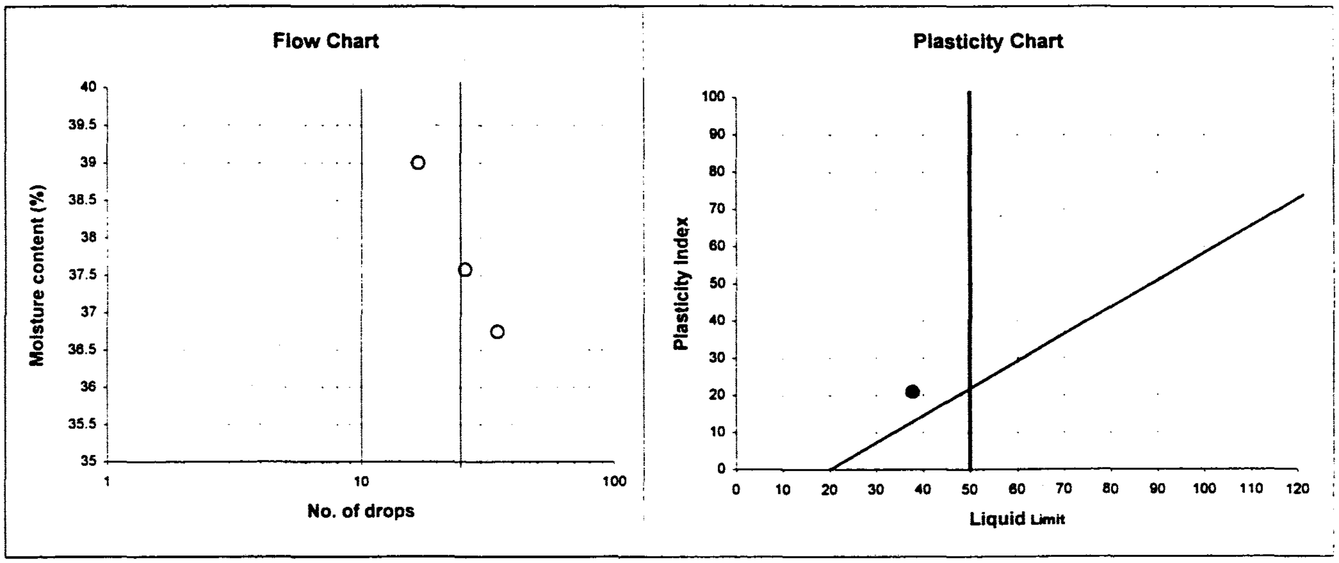
Plastic Limit

Wet wt. of soil + dish wt. (gm)	26.17	
Dry wt. of soil + dish wt. (gm)	25.26	
Wt. of dish (gm)	19.85	
Dish ID	D	
Moisture Content (%)	16.8	

Liquid Limit

Wet wt. of soil + dish wt. (gm)	36.31	35.04	35.18		
Dry wt. of soil + dish wt. (gm)	31.75	30.73	30.82		
Wt. of dish (gm)	19.34	19.26	19.64		
Dish ID	A	B	C		
Number of drops	35	26	17		
Moisture Content (%)	36.7	37.6	39.0		
LL	38.3	37.8	37.2		

Moisture As rec'd
–
–



Result: **LL = 37.7** **PL = 16.8** **PI = 20.9** **CL**

Atterberg Limits - ASTM D4318

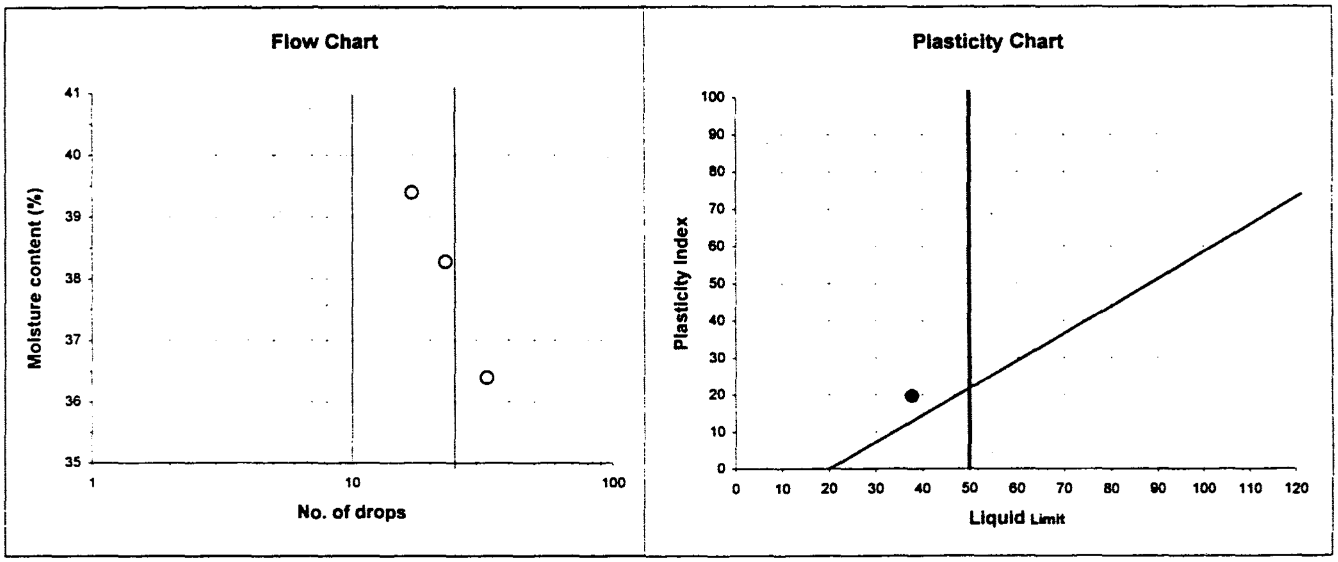
Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 4
Sample # : S-2
Depth (ft) : 16 - 18
Date tested : 12-98
Tested by : YD
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

Plastic Limit

Wet wt. of soil + dish wt. (gm)	25.95	
Dry wt. of soil + dish wt. (gm)	24.97	
Wt. of dish (gm)	19.52	
Dish ID	U	
Moisture Content (%)	18.0	

Liquid Limit

						Moisture As rec'd
Wet wt. of soil + dish wt. (gm)	34.47	35.91	35.21			
Dry wt. of soil + dish wt. (gm)	30.55	31.47	30.91			
Wt. of dish (gm)	19.77	19.88	19.98			
Dish ID	R	S	T			
Number of drops	33	23	17			–
Moisture Content (%)	36.4	38.3	39.4			
LL	37.6	37.9	37.6			–



Result: LL = 37.7 PL = 18.0 PI = 19.7 CL

Atterberg Limits - ASTM D4318

Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 5
Sample # : S-2
Depth (ft) : 23 -25
Date tested : 12/19/98
Tested by : YD
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

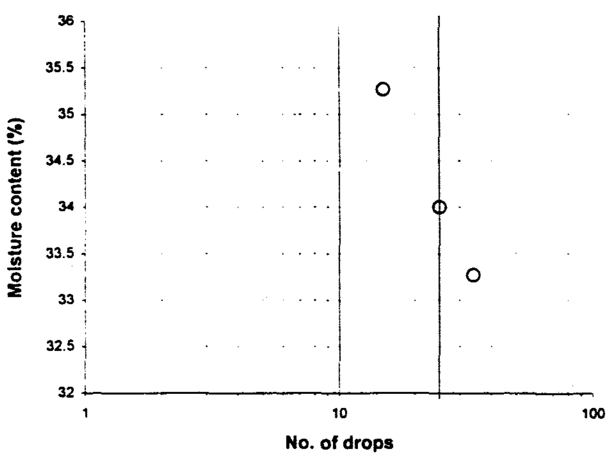
Plastic Limit

Wet wt. of soil + dish wt. (gm)	27.24	
Dry wt. of soil + dish wt. (gm)	26.10	
Wt. of dish (gm)	19.55	
Dish ID	Y	
Moisture Content (%)	17.4	

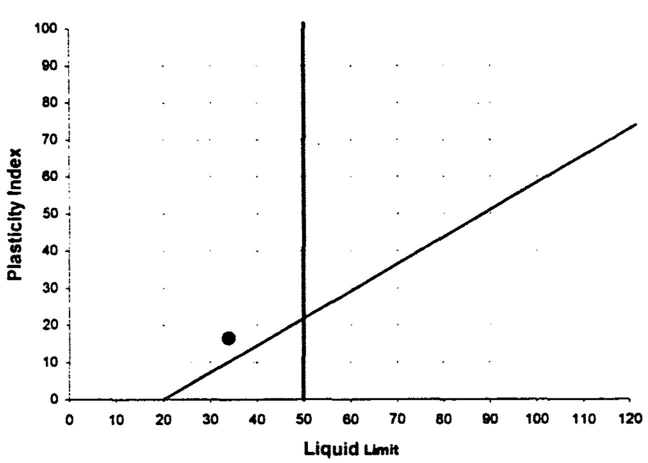
Liquid Limit

						Moisture As rec'd
Wet wt. of soil + dish wt. (gm)	36.39	34.84	34.40			
Dry wt. of soil + dish wt. (gm)	32.29	31.02	30.47			
Wt. of dish (gm)	19.96	19.78	19.30			
Dish ID	V	W	X			
Number of drops	34	25	15			–
Moisture Content (%)	33.3	34.0	35.3			
LL	34.5	34.0	33.2			–

Flow Chart



Plasticity Chart



Result: **LL = 33.9** **PL = 17.4** **PI = 16.5** **CL**

Atterberg Limits - ASTM D4318

Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 6
Sample # : BK-3
Depth (ft) : -
Date tested : -
Tested by : -
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

Plastic Limit

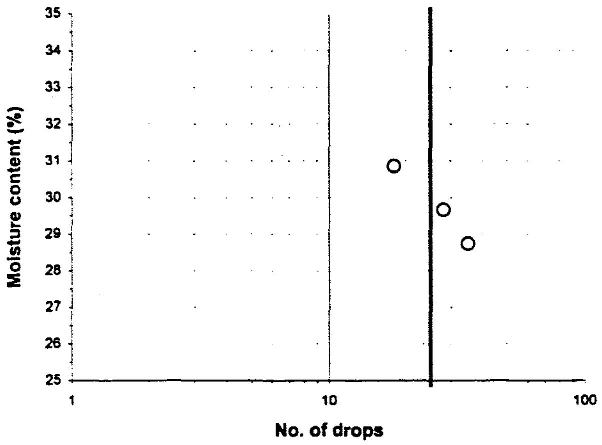
Wet wt. of soil + dish wt. (gm)	26.60	
Dry wt. of soil + dish wt. (gm)	25.52	
Wt. of dish (gm)	19.07	
Dish ID	-	
Moisture Content (%)	16.7	

Liquid Limit

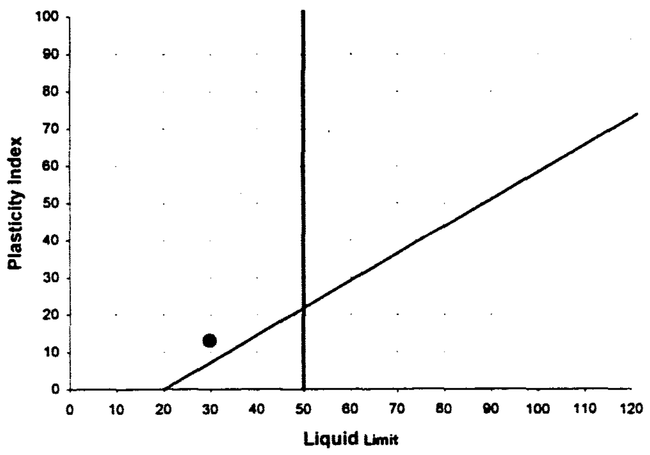
Wet wt. of soil + dish wt. (gm)	37.10	37.30	38.22		
Dry wt. of soil + dish wt. (gm)	33.21	33.28	33.90		
Wt. of dish (gm)	19.67	19.74	19.89		
Dish ID	-	-	-		
Number of drops	35	28	18		
Moisture Content (%)	28.7	29.7	30.9		
LL	29.9	30.1	29.7		

Moisture As rec'd
–
–

Flow Chart



Plasticity Chart



Result: LL = 29.9 PL = 16.7 PI = 13.1 CL

Atterberg Limits - ASTM D4318

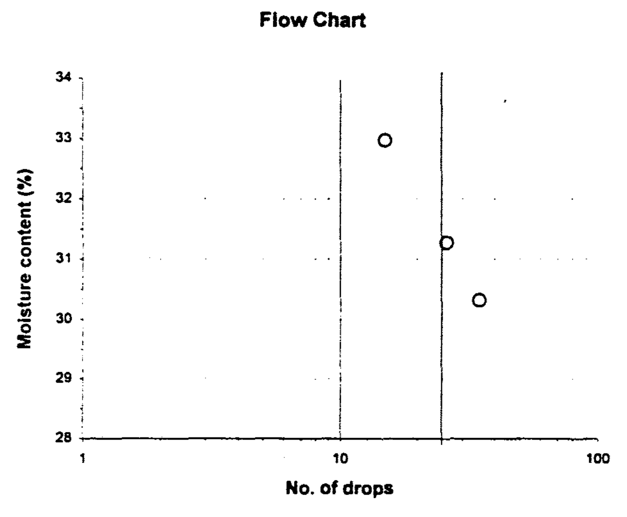
Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 6
Sample # : L 1b
Depth (ft) : 6-6.5
Date tested : 12/21/98
Tested by : YD
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

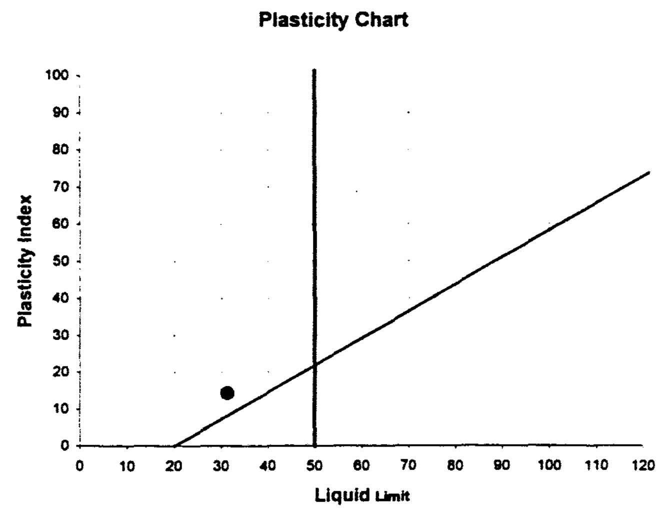
Plastic Limit

Wet wt. of soil + dish wt. (gm)	25.86	
Dry wt. of soil + dish wt. (gm)	24.98	
Wt. of dish (gm)	19.80	
Dish ID	E	
Moisture Content (%)	17.0	

Liquid Limit

						Moisture As rec'd
Wet wt. of soil + dish wt. (gm)	34.48	35.40	35.84			
Dry wt. of soil + dish wt. (gm)	30.81	31.67	32.13			
Wt. of dish (gm)	19.67	19.74	19.89			
Dish ID	F	G	H			
Number of drops	15	26	35			–
Moisture Content (%)	33.0	31.3	30.3			
LL	31.0	31.4	31.6			–





Result: LL = 31.3 PL = 17.0 PI = 14.3 CL

Atterberg Limits - ASTM D4318

Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 6
Sample # : S-1
Depth (ft) : 10-12
Date tested : 12/11/98
Tested by : YD
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

Plastic Limit

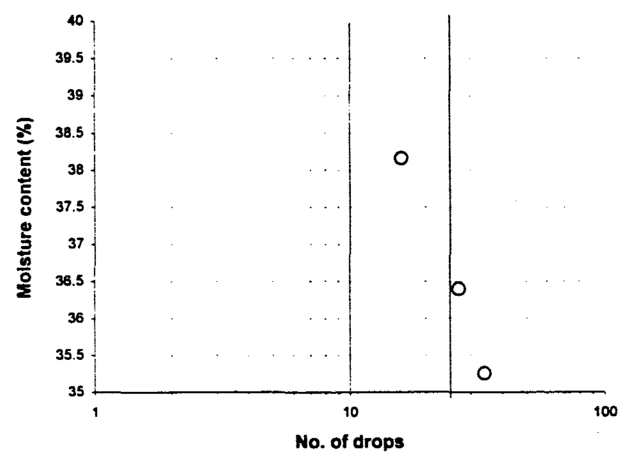
Wet wt. of soil + dish wt. (gm)	24.50	
Dry wt. of soil + dish wt. (gm)	23.83	
Wt. of dish (gm)	19.98	
Dish ID	T	
Moisture Content (%)	17.6	

Liquid Limit

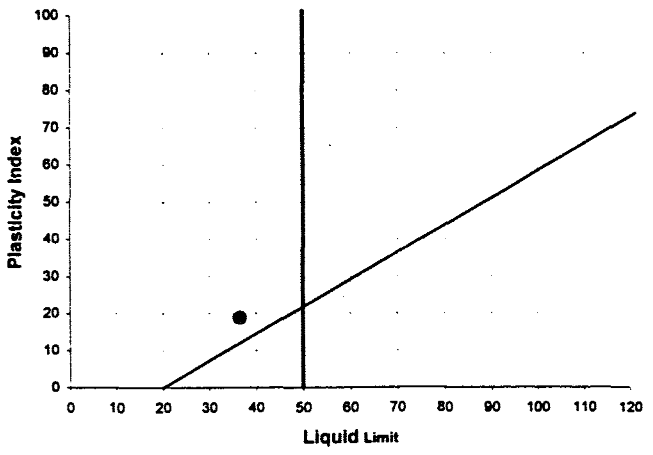
Wet wt. of soil + dish wt. (gm)	35.35	36.03	34.46		
Dry wt. of soil + dish wt. (gm)	31.12	31.62	30.41		
Wt. of dish (gm)	19.10	19.50	19.77		
Dish ID	P	Q	R		
Number of drops	34	27	16		
Moisture Content (%)	35.3	36.4	38.2		
LL	36.6	36.7	36.2		

Moisture As rec'd
–
–

Flow Chart



Plasticity Chart



Result: LL = 36.5 PL = 17.6 PI = 18.9 CL

Atterberg Limits - ASTM D4318

Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 8
Sample # : L 1b
Depth (ft) : 2.5 - 3
Date tested : 1/14/99
Tested by : WL
Soil : (CH)
Notes : Wet preparation, - #40 mat'l only

Plastic Limit

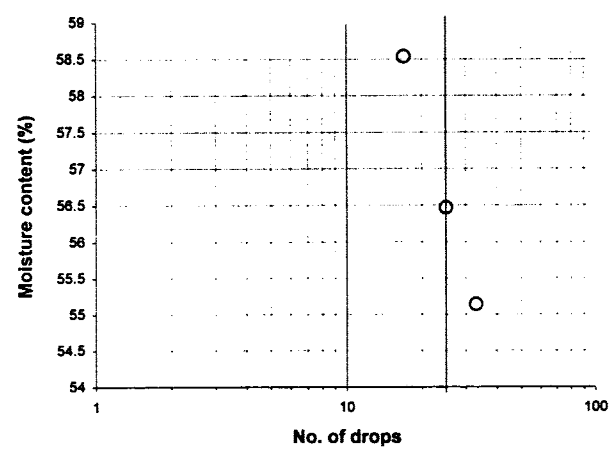
Wet wt. of soil + dish wt. (gm)	26.02	
Dry wt. of soil + dish wt. (gm)	23.27	
Wt. of dish (gm)	11.26	
Dish ID	20b	
Moisture Content (%)	22.9	

Liquid Limit

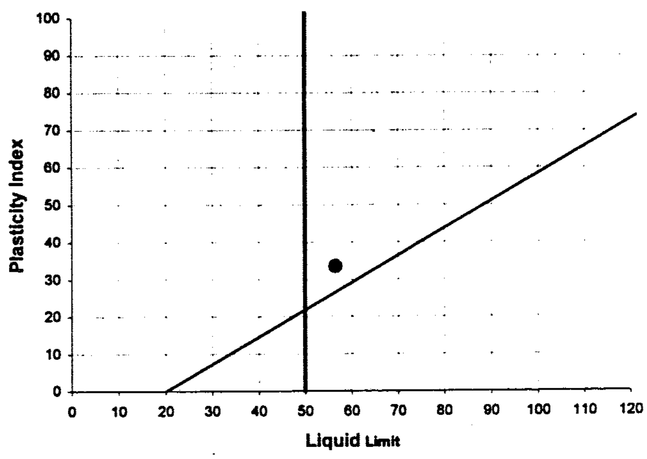
Wet wt. of soil + dish wt. (gm)	25.93	25.80	27.71		
Dry wt. of soil + dish wt. (gm)	22.39	22.22	23.39		
Wt. of dish (gm)	15.97	15.88	16.01		
Dish ID	5b	31c	56b		
Number of drops	33	25	17		
Moisture Content (%)	55.1	56.5	58.5		
LL	57.0	56.5	55.9		

Moisture As rec'd
–
–

Flow Chart



Plasticity Chart



Result: **LL = 56.5** **PL = 22.9** **PI = 33.6** **CH**

Atterberg Limits - ASTM D4318

Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 10
Sample # : BK-2
Depth (ft) : -
Date tested : -
Tested by : -
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

Plastic Limit

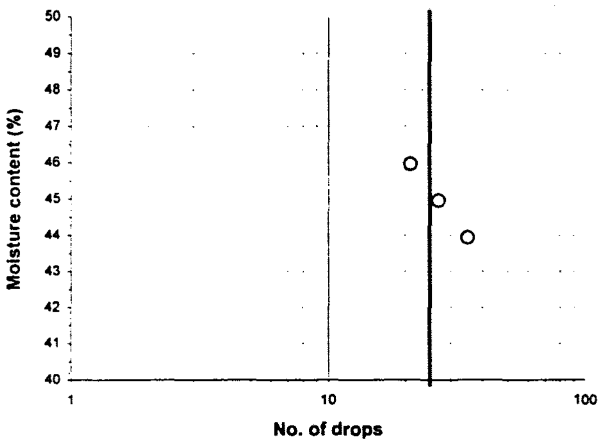
Wet wt. of soil + dish wt. (gm)	27.38	
Dry wt. of soil + dish wt. (gm)	26.20	
Wt. of dish (gm)	19.88	
Dish ID	s	
Moisture Content (%)	18.7	

Liquid Limit

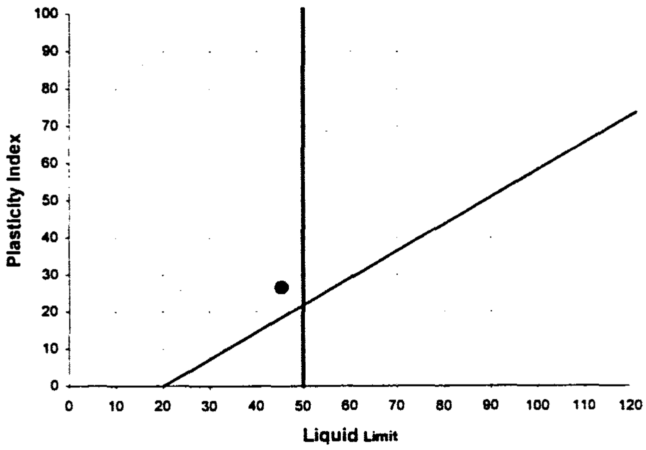
Wet wt. of soil + dish wt. (gm)	34.79	34.37	35.23		
Dry wt. of soil + dish wt. (gm)	30.00	29.76	30.36		
Wt. of dish (gm)	19.10	19.50	19.77		
Dish ID	p	q	r		
Number of drops	35	27	21		
Moisture Content (%)	43.9	45.0	46.0		
LL	45.8	45.4	45.0		

Moisture As rec'd
–
–

Flow Chart



Plasticity Chart



Result: **LL = 45.4** **PL = 18.7** **PI = 26.7** **CL**

Atterberg Limits - ASTM D4318

Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 10
Sample # : L 2b
Depth (ft) : 5-5.5
Date tested : 12/21/98
Tested by : YD
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

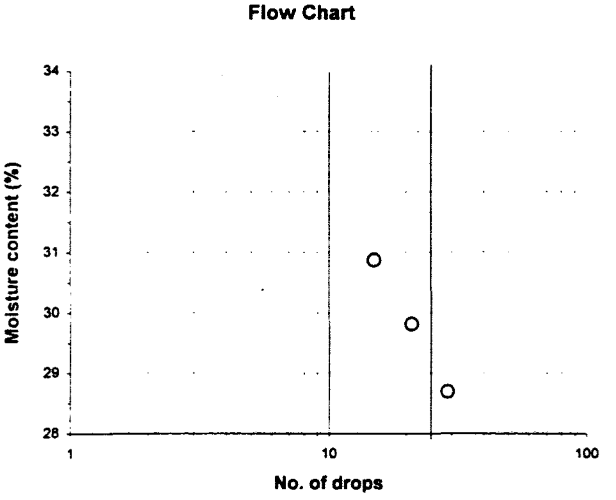
Plastic Limit

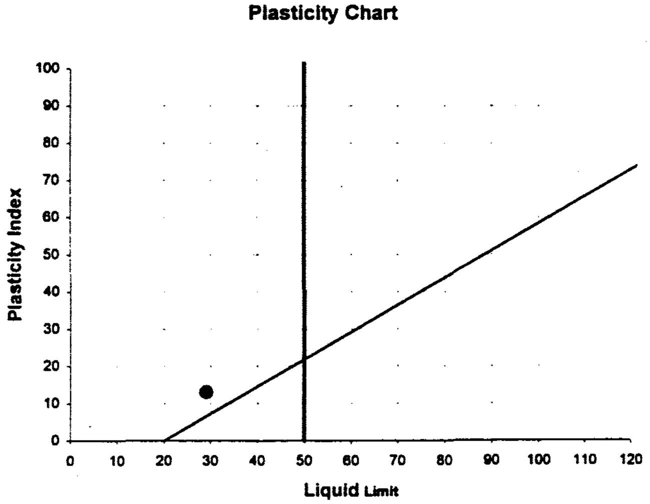
Wet wt. of soil + dish wt. (gm)	27.05	
Dry wt. of soil + dish wt. (gm)	26.06	
Wt. of dish (gm)	19.90	
Dish ID	L	
Moisture Content (%)	16.1	

Liquid Limit

Wet wt. of soil + dish wt. (gm)	34.51	36.04	36.88		
Dry wt. of soil + dish wt. (gm)	31.13	32.14	32.87		
Wt. of dish (gm)	19.35	19.06	19.88		
Dish ID	I	J	K		
Number of drops	29	21	15		
Moisture Content (%)	28.7	29.8	30.9		
LL	29.2	29.2	29.0		

Moisture As rec'd
–
–





Result: **LL = 29.1** **PL = 16.1** **PI = 13.1** **CL**

Atterberg Limits - ASTM D4318

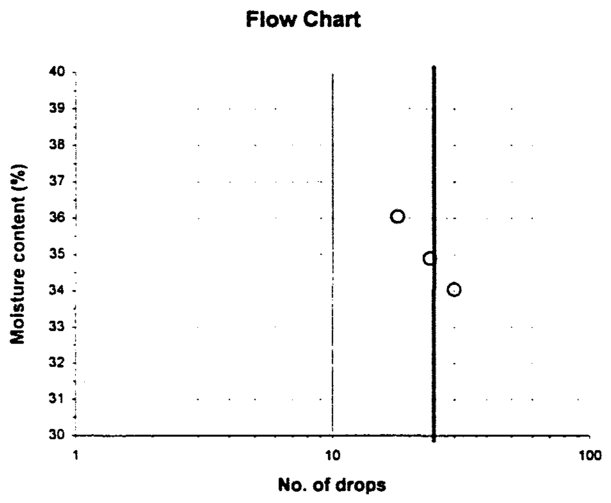
Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 10
Sample # : S-1
Depth (ft) : 6-8
Date tested : 12/5/98
Tested by : YD
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

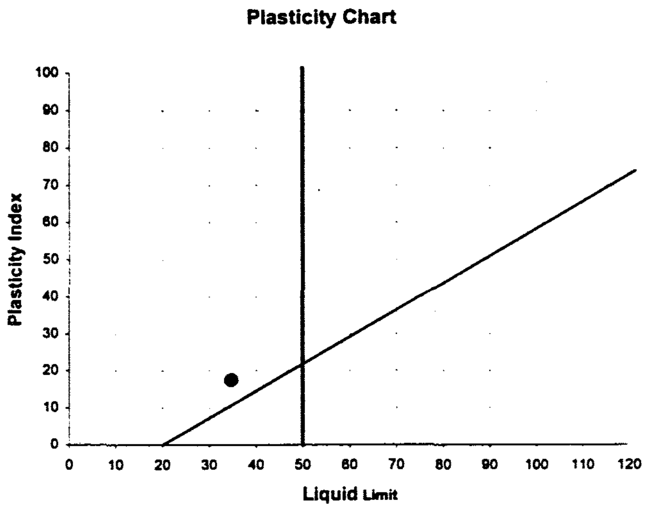
Plastic Limit

Wet wt. of soil + dish wt. (gm)	26.70	
Dry wt. of soil + dish wt. (gm)	25.73	
Wt. of dish (gm)	20.10	
Dish ID	O	
Moisture Content (%)	17.3	

Liquid Limit

						Moisture As rec'd
Wet wt. of soil + dish wt. (gm)	35.62	35.28	32.80			
Dry wt. of soil + dish wt. (gm)	31.63	31.30	29.36			
Wt. of dish (gm)	19.89	19.91	19.79			
Dish ID	K	L	N			
Number of drops	30	24	18			–
Moisture Content (%)	34.0	34.9	36.0			
LL	34.8	34.7	34.6			–





Result: **LL = 34.7** **PL = 17.3** **PI = 17.5** **CL**

Atterberg Limits - ASTM D4318

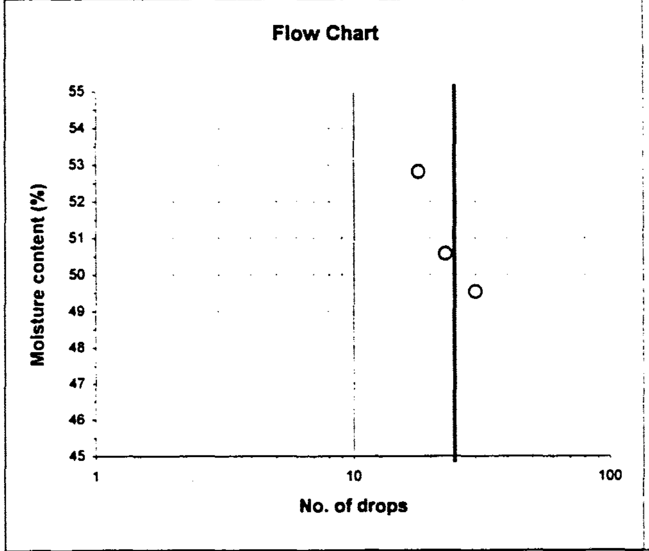
Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 10
Sample # : S-3
Depth (ft) : 13.5-15
Date tested : 12/13/98
Tested by : YD
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

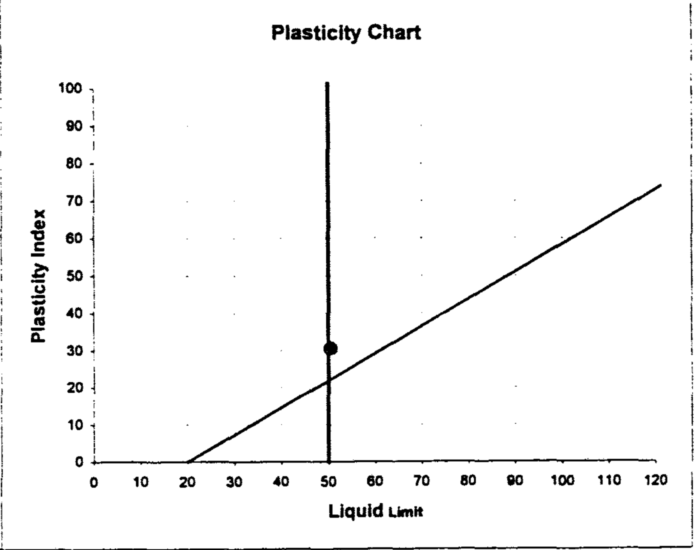
Plastic Limit

Wet wt. of soil + dish wt. (gm)	25.81	
Dry wt. of soil + dish wt. (gm)	24.83	
Wt. of dish (gm)	19.91	
Dish ID	L	
Moisture Content (%)	20.0	

Liquid Limit

						Moisture As rec'd
Wet wt. of soil + dish wt. (gm)	33.23	33.74	34.07			
Dry wt. of soil + dish wt. (gm)	28.44	28.81	29.37			
Wt. of dish (gm)	19.37	19.07	19.89			
Dish ID	I	J	K			
Number of drops	18	23	30			–
Moisture Content (%)	52.8	50.6	49.5			
LL	50.8	50.1	50.6			–


Flow Chart


Plasticity Chart

Result: LL = 50.5 PL = 20.0 PI = 30.5 CH

Atterberg Limits - ASTM D4318

Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : --
Boring # : DH - 11
Sample # : L 1b
Depth (ft) : 3-3.5
Date tested : 12-98
Tested by : YD
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

Plastic Limit

Wet wt. of soil + dish wt. (gm)	27.66	
Dry wt. of soil + dish wt. (gm)	26.54	
Wt. of dish (gm)	20.10	
Dish ID	O	
Moisture Content (%)	17.4	

Liquid Limit

Wet wt. of soil + dish wt. (gm)	36.40	38.33	34.59		
Dry wt. of soil + dish wt. (gm)	32.32	33.67	30.73		
Wt. of dish (gm)	19.89	19.91	20.00		
Dish ID	K	L	M		
Number of drops	34	25	16		
Moisture Content (%)	32.9	33.8	35.9		
LL	34.1	33.8	34.0		

Moisture As rec'd
--
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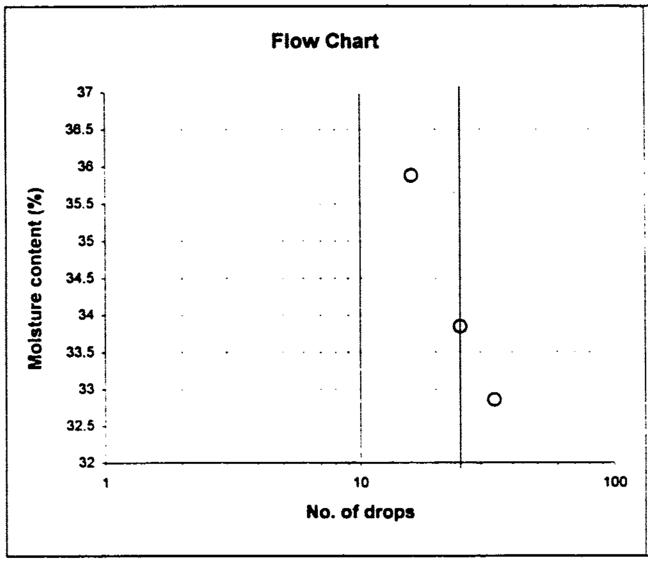
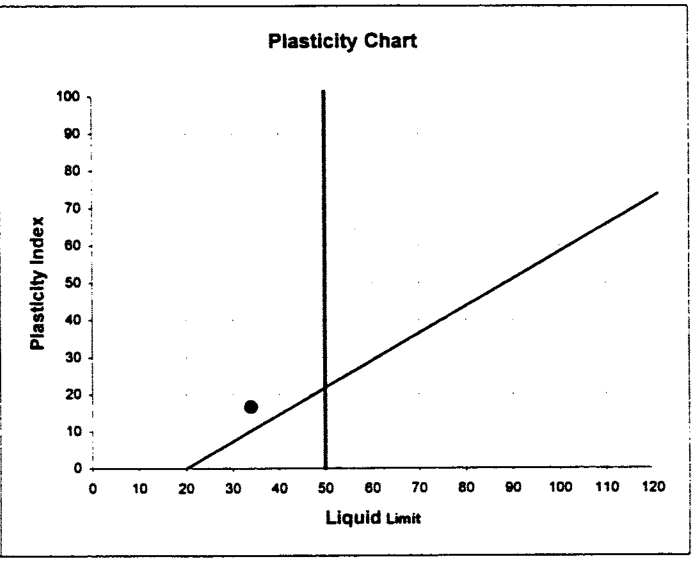




Result: LL = 34.0 PL = 17.4 PI = 16.6 CL

Atterberg Limits - ASTM D4318

Client : Santa Clara Valley Water Dist.
Project : Thompson Creek
Job # : –
Boring # : DH - 12
Sample # : BK-1
Depth (ft) : -
Date tested : -
Tested by : -
Soil : (CL)
Notes : Wet preparation, - #40 mat'l only

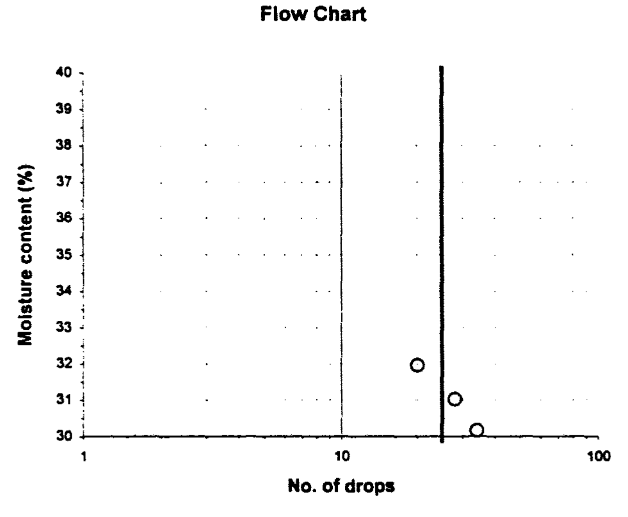
Plastic Limit

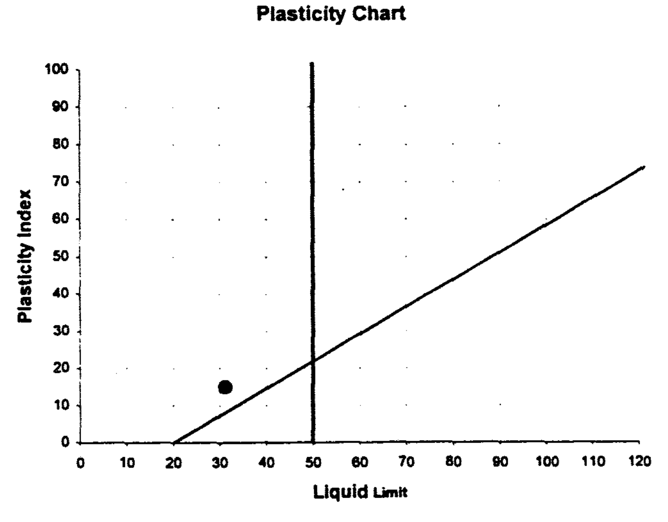
Wet wt. of soil + dish wt. (gm)	26.90	
Dry wt. of soil + dish wt. (gm)	25.95	
Wt. of dish (gm)	20.10	
Dish ID	O	
Moisture Content (%)	16.3	

Liquid Limit

Wet wt. of soil + dish wt. (gm)	38.04	36.46	36.29		
Dry wt. of soil + dish wt. (gm)	33.83	32.54	32.29		
Wt. of dish (gm)	19.90	19.92	19.79		
Dish ID	K	L	N		
Number of drops	34	28	20		
Moisture Content (%)	30.2	31.0	32.0		
LL	31.3	31.5	31.1		

Moisture As rec'd
–
–

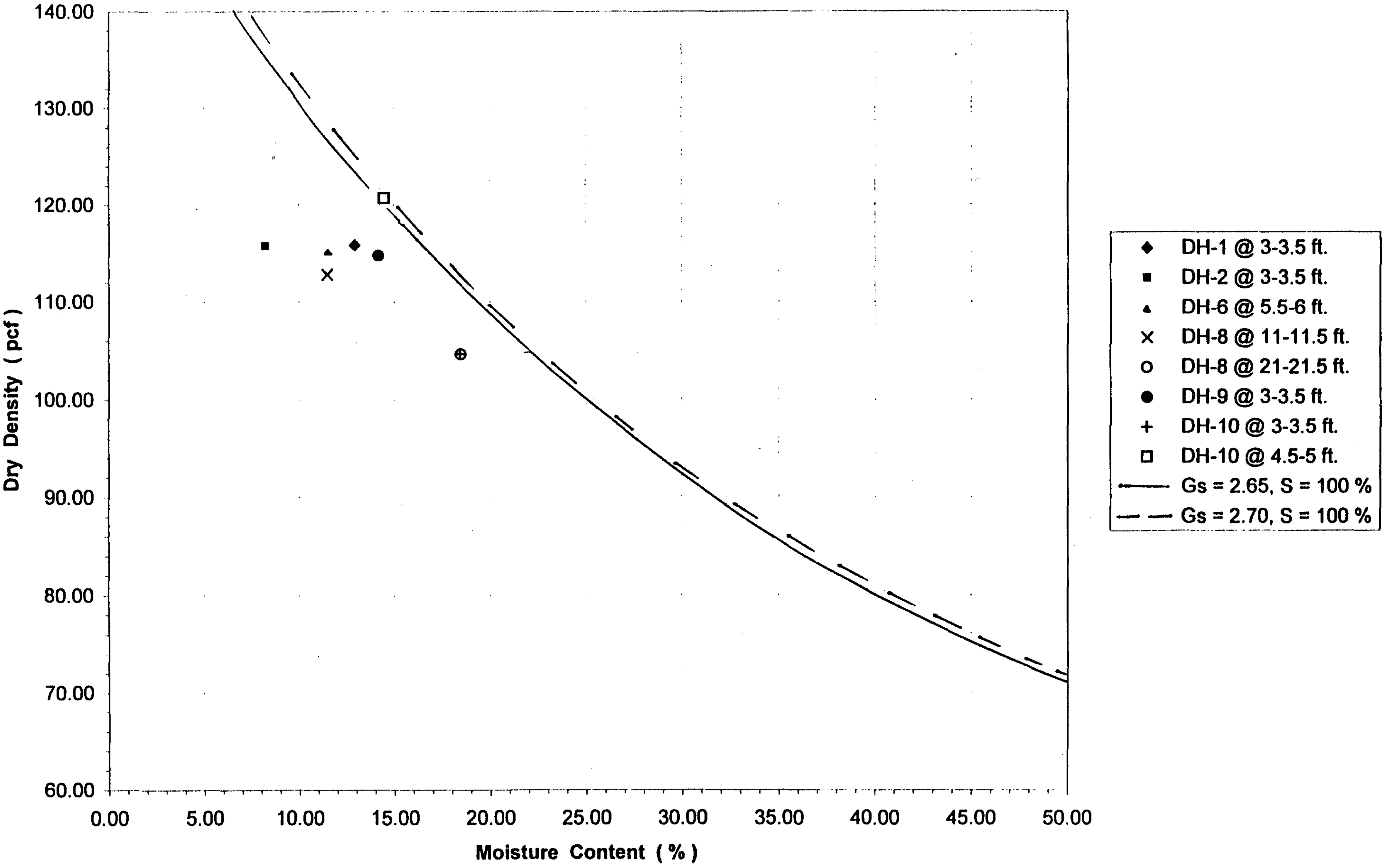

Flow Chart


Plasticity Chart

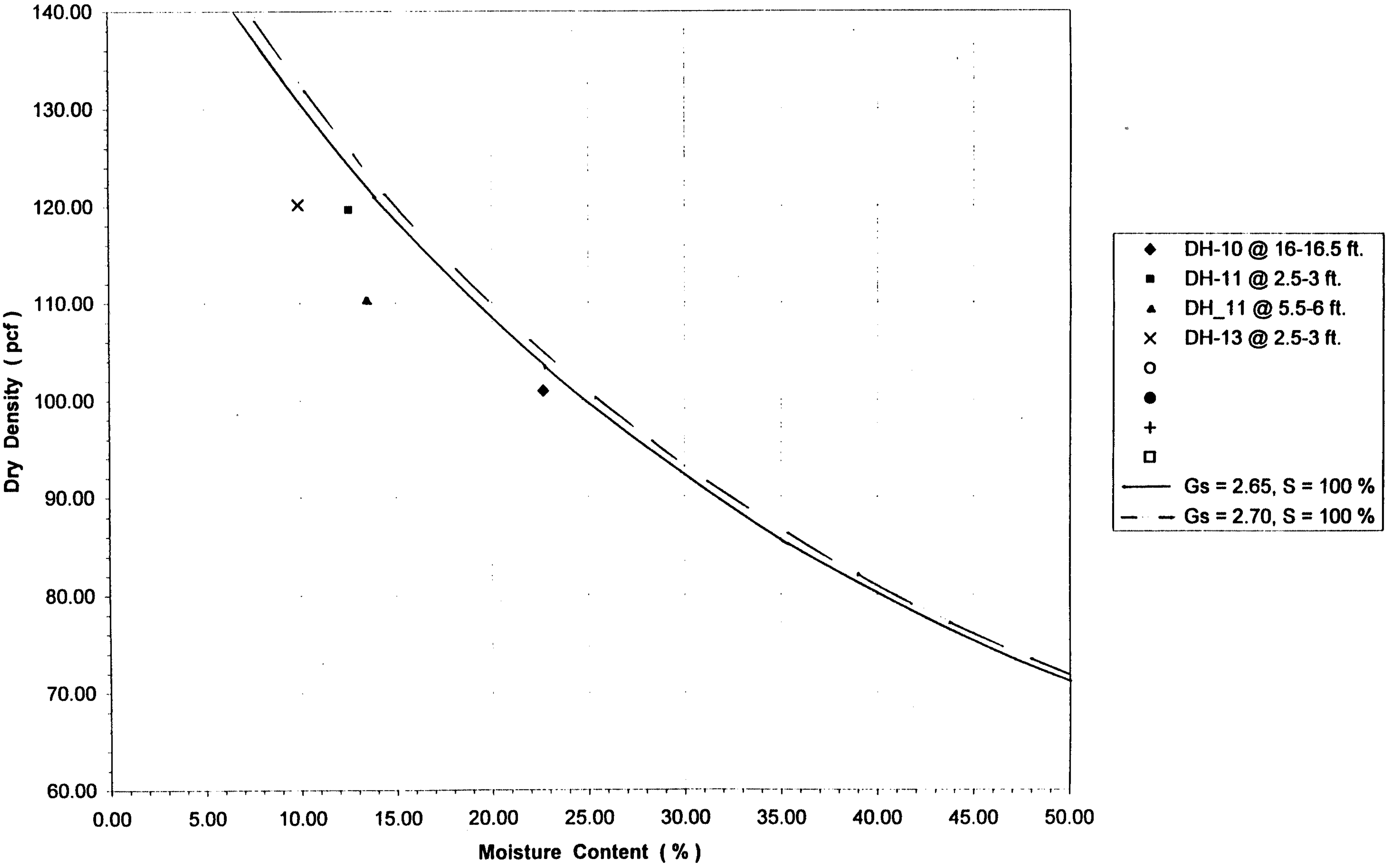
Result: LL = 31.3 PL = 16.3 PI = 15.0 CL

MOISTURE AND DENSITY TESTS

Job no : 203444   **Moisture Content Vs Dry Density**



Job no : 203444 Moisture Content Vs Dry Density



MOISTURE & DENSITY TEST

Client : ____________ Project : Thompson Creek Job no : 203444

Boring #	DH-1	DH-2	DH-6	DH-8	DH-8	DH-9	DH-10	DH-10	
Sample #	L1B	L1B	L1A	L2B	L3B	L1B	L1B	L2A	
Depth (ft.)	3-3.5	3-3.5	5.5-6	11-11.5	21-21.5	3-3.5	3-3.5	4.5-5	
Soil type: (visual)	Silty brown clay with traces of sm, rock	Tan sand with some clay & sm,med rock	DK brown clay & sand with sm,rock. disturbance on side	Brown sand with clay & sm, rock	Tan clay with sand & fine sm, lg rock. disturance on side	BLK clay & sm, med,lg rock	BLK clay with sand sm,rock disturbance on side	BLK clay with sand, 2 lg rocks disturbance on side	
1. Date tested:	12/1/98	12/1/98	12/1/98	12/1/98	12/1/98	12/1/98	12/1/98	12/1/98	1.
2. Tested by:	BL/BC	BL/BC	BL/BC	BL/BC	BL/BC	BL/BC	BL/BC		
3. Specimen height (in.)	6	6	6	5.42	5.54	6	6	5.5	3.
4. Wt. of specimen + tare (gm)	1174.2	1125.6	1153.5	1038.8	1057	1168.3	1113.7	1148.3	4.
5. Tare wt. (gm)	220.22	220.1	220.3	220.3	220.5	220.8	220.4	220.6	5.
6. Diameter (in.)	2.427	2.416	2.422	2.412	2.43	2.417	2.413	2.432	6.
7. Wet wt. of soil + dish wt. (gm)	711.9	577.7	1083.1	749	914	734.6	685.4	670.1	7.
8. Dry wt. of soil + dish wt. (gm)	662.1	555.5	1000.9	701.2	817.7	678.7	623	622.8	8.
9. Wt. of dish (gm)	277	286.3	285.2	285.6	296.7	284.3	284.8	296.1	9.
10. Dish ID	13	2	4	20	10	3	1	12	10.

Wet Density (pcf)	130.8	125.3	128.5	125.8	123.9	131.0	123.9	138.2
Dry Density (pcf)	115.8	115.8	115.3	112.8	104.6	114.7	104.6	120.7
Moisture Content (%)	12.9	8.2	11.5	11.5	18.5	14.2	18.5	14.5

Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.454	0.455	0.462	0.493	0.611	0.468	0.610	0.396
Saturation (%)	76.8	48.9	67.2	63.0	81.7	81.7	81.6	98.8

MOISTURE & DENSITY TEST

Client: ______ Project : Thompson Creek Job no : 203444

Boring #	DH-10	DH-11	DH_11	DH-13				
Sample #	L3B	L1A	L2A	L1B				
Depth (ft.)	16-16.5	2.5-3	5.5-6	2.5-3				
Soil type: (visual)	Drark gray clay with sand	BLK clay with sand& sm, rocks increasing clay at bottom . 1 lg rock	BLK clay with sand & sm, rocks. 1 lg rock, 1 lg dsturbance on side	BLK clay with sand sm, med, rocks				
1. Date tested:	12/1/98	12/1/98	12/1/98	12/1/98				1.
2. Tested by:	BL/BC	BL/BC	BL/BC	BL/BC				
3. Specimen height (in.)	6	6	5.82	5.34				3.
4. Wt. of specimen + tare (gm)	1111.2	1185.5	1105	1062.9				4.
5. Tare wt. (gm)	220.2	220.5	219.7	220.3				5.
6. Diameter (in.)	2.411	2.406	2.425	2.406				6.
7. Wet wt. of soil + dish wt. (gm)	775.4	668.2	808.2	713.1				7.
8. Dry wt. of soil + dish wt. (gm)	687.1	626.7	747.3	674.4				8.
9. Wt. of dish (gm)	297.4	296.2	295.5	284.6				9.
10. Dish ID	15	11	8	6				10.

Wet Density (pcf)	123.8	134.6	125.4	132.1				
Dry Density (pcf)	100.9	119.6	110.5	120.2				
Moisture Content (%)	22.7	12.6	13.5	9.9				

Gs (Assumed)	2.70	2.70	2.70	2.70				
Void Ratio	0.669	0.408	0.525	0.402				
Saturation (%)	91.4	83.0	69.3	66.7				

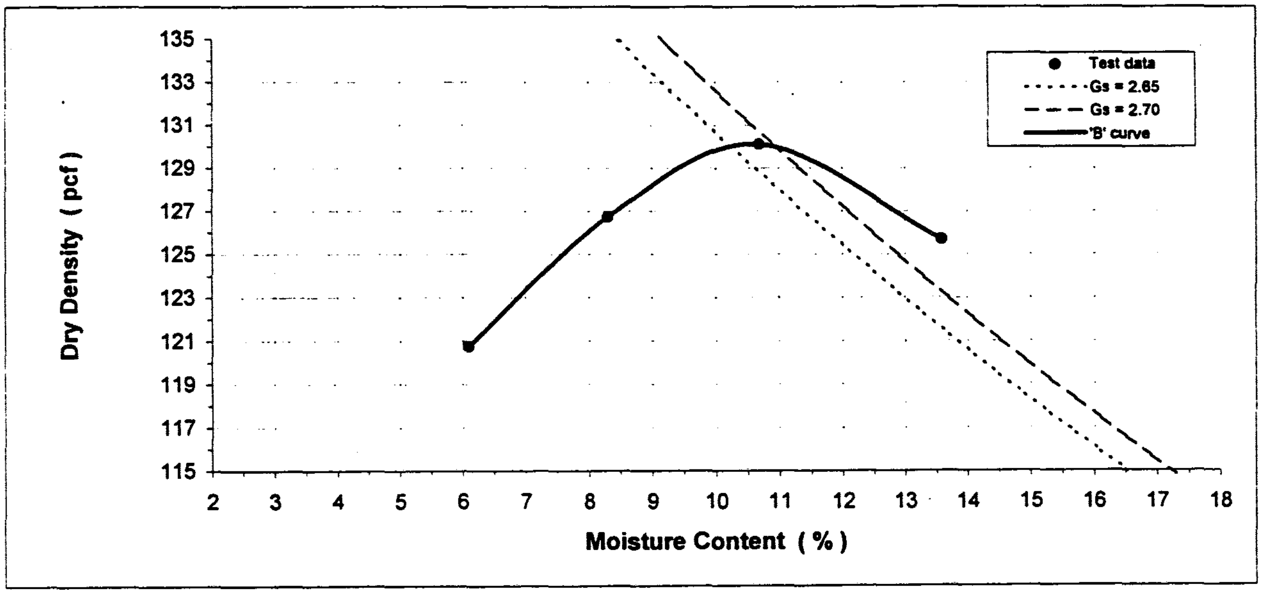
COMPACTION TESTS

COMPACTION TEST

Client : Santa Clara Valley Water District
Project : Thompson Creek
Job # : --
Boring # : DH - 6
Sample # : BK - 3
Depth (ft) : --
Date tested : 11/24/98
Tested by : VS
Soil : Lt brown silty sand w/ some clay & tr. fine gravel
Notes :

Method of Compaction : ASTM D1557 - 91 - " B "
Wt. of mold : 2180 gms
Volume of mold : 0.033263 cu. ft.

Wt. of specimen + mold (gm)	4113.0	4251.0	4353.0	4334.0			
Wet wt. of soil + dish wt. (gm)	548.5	579.7	527.0	544.4			
Dry wt. of soil + dish wt. (gm)	517.0	535.2	476.1	479.3			
Wt. of dish (gm)	0.0	0.0	0.0	0.0			
Dish ID							
Wet Density (pcf)	128.1	137.3	144.0	142.8			
Dry Density (pcf)	120.8	126.7	130.1	125.7			
Moisture Content (%)	6.1	8.3	10.7	13.6			



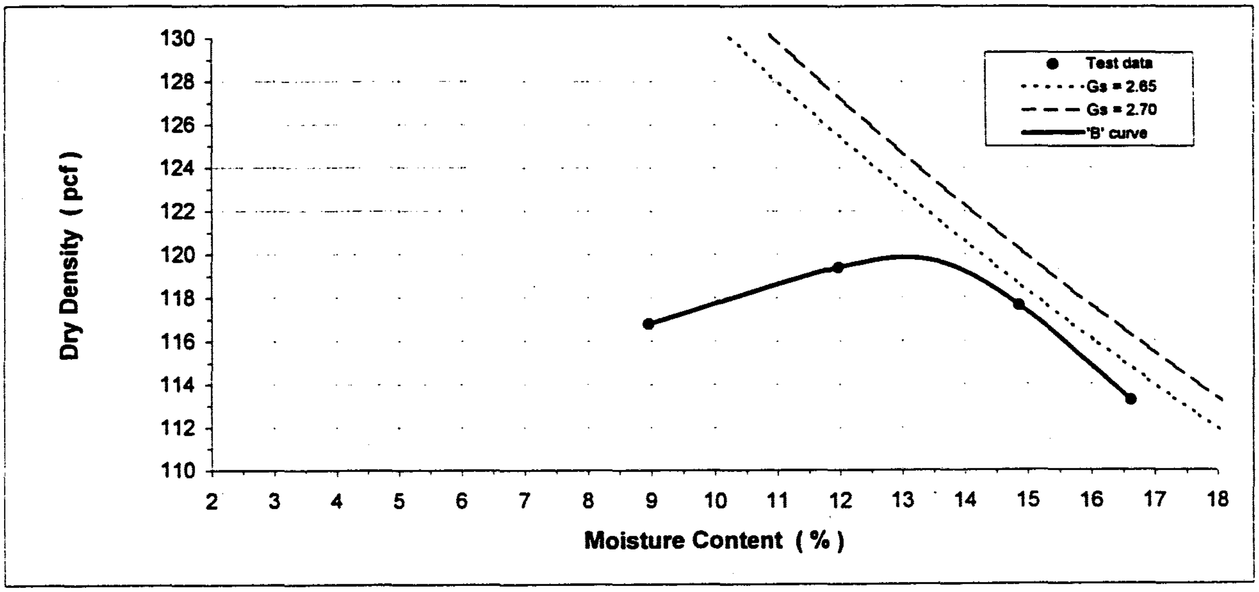
Test Results :	Maximum Dry density (pcf)	Optimum Moisture (%)	L.L. (%)	P.I. (%)	-#200 (%)	M.C. as Received (%)
ASTM D1557 - 91 - " B "	130.0	10.5	-	-	-	-
After rock correction:	**130.7**	**10.3**				

COMPACTION TEST

Client : Santa Clara Valley Water District
Project : Thompson Creek
Job # : –
Boring # : DH - 10
Sample # : BK - 2
Depth (ft) : –
Date tested : 12/1/98
Tested by : VS
Soil : (CL) Grayish brown sandy clay w/ tr. f. gravel
Notes : % of +3/8" = 5 %

Method of Compaction : ASTM D1557 - 91 - " B "
Wt. of mold : 2180 gms
Volume of mold : 0.033263 cu. ft.

Wt. of specimen + mold (gm)	4100.0	4197.0	4219.0	4173.0			
Wet wt. of soil + dish wt. (gm)	545.9	531.2	583.4	570.3			
Dry wt. of soil + dish wt. (gm)	501.0	474.4	507.9	489.0			
Wt. of dish (gm)	0.0	0.0	0.0	0.0			
Dish ID							
Wet Density (pcf)	127.3	133.7	135.1	132.1			
Dry Density (pcf)	116.8	119.4	117.6	113.3			
Moisture Content (%)	9.0	12.0	14.9	16.6			



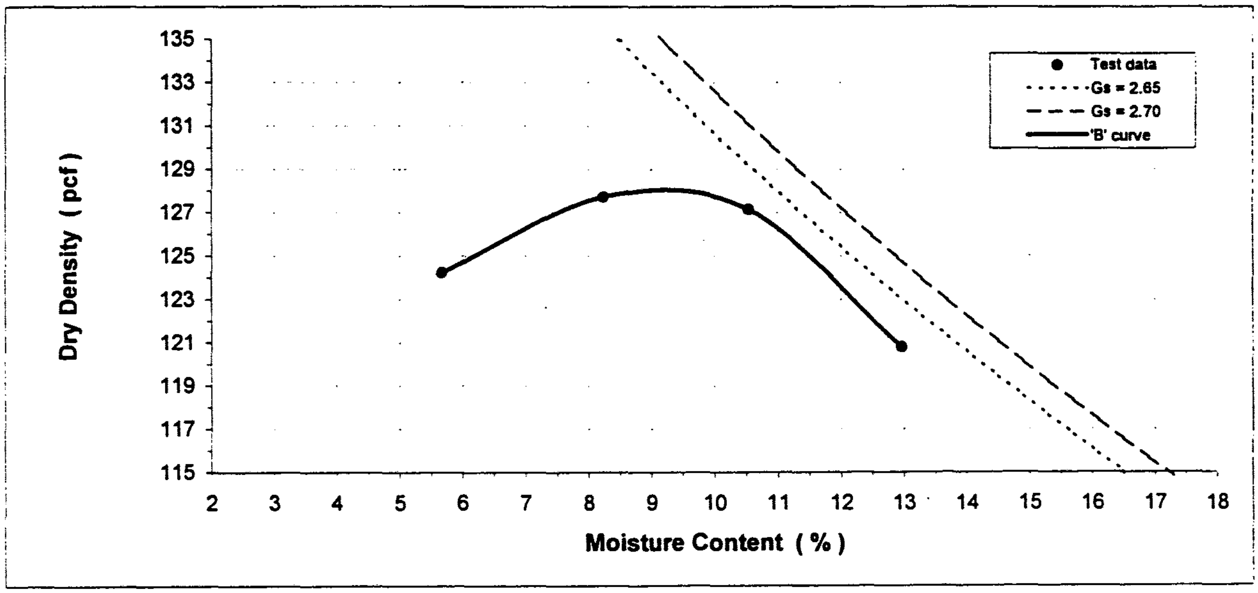
Test Results :	Maximum Dry density (pcf)	Optimum Moisture (%)	L.L. (%)	P.I. (%)	-#200 (%)	M.C. as Received (%)
ASTM D1557 - 91 - " B "	120.0	13.2	-	-	-	-
After rock correction:	**121.8**	**12.6**				

COMPACTION TEST

Client : Santa Clara Valley Water District
Project : Thompson Creek
Job # : –
Boring # : DH - 12
Sample # : BK - 1
Depth (ft) : –
Date tested : 12/1/98
Tested by : VS
Soil : Sandy clay w/ gravel
Notes : % of +3/8" = 7 %

Method of Compaction : ASTM D1557 - 91 - " B "
Wt. of mold : 2180 gms
Volume of mold : 0.033263 cu. ft.

Wt. of specimen + mold (gm)	4161.0	4266.0	4301.0	4239.0			
Wet wt. of soil + dish wt. (gm)	580.9	568.2	520.8	589.1			
Dry wt. of soil + dish wt. (gm)	549.7	524.9	471.1	521.5			
Wt. of dish (gm)	0.0	0.0	0.0	0.0			
Dish ID							
Wet Density (pcf)	131.3	138.3	140.6	136.5			
Dry Density (pcf)	124.2	127.7	127.2	120.8			
Moisture Content (%)	5.7	8.2	10.5	13.0			

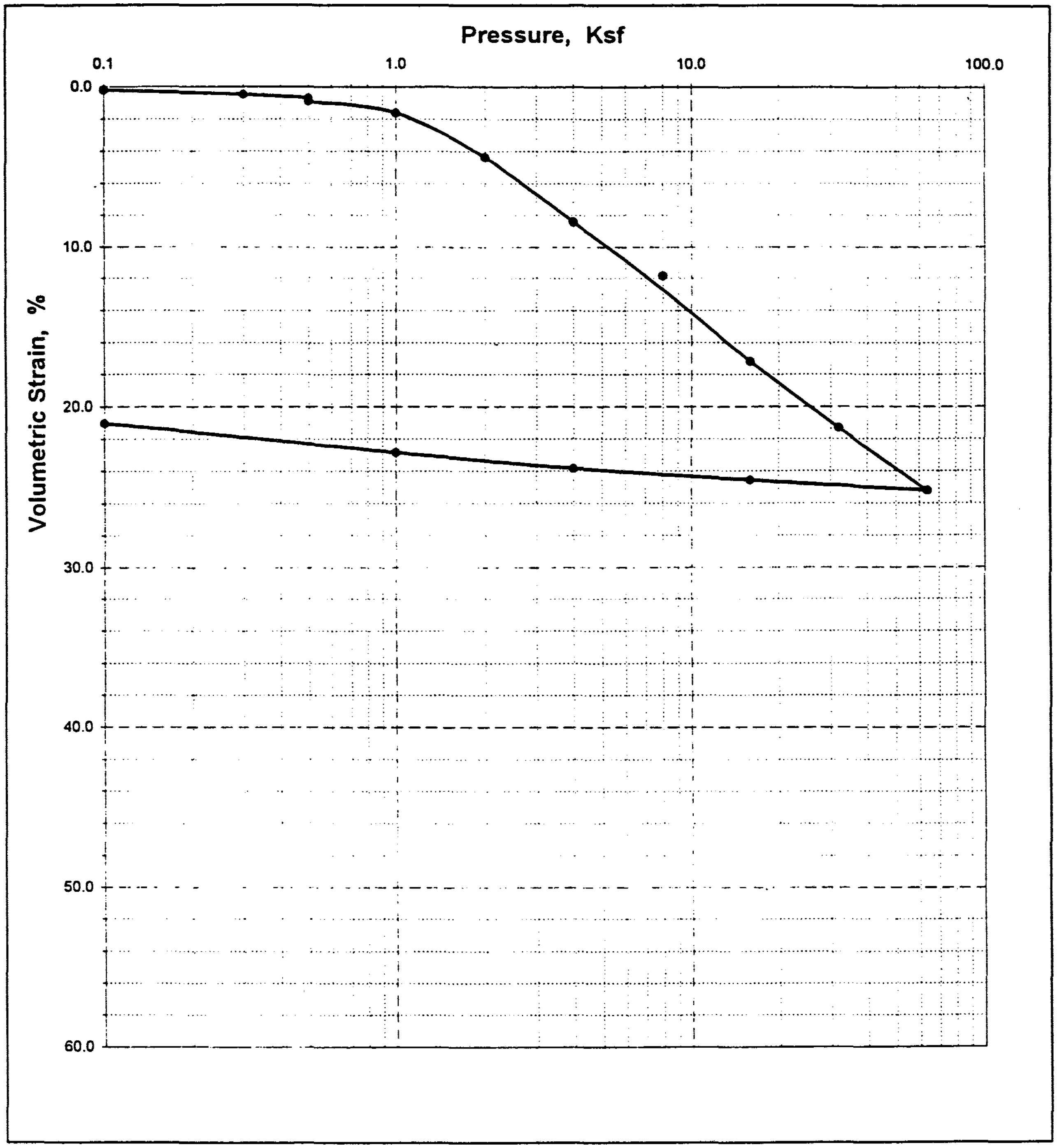


Test Results :	Maximum Dry density (pcf)	Optimum Moisture (%)	L.L. (%)	P.I. (%)	-#200 (%)	M.C. as Received (%)
ASTM D1557 - 91 - " B "	128.0	9.5	-	-	-	-
After rock correction:	**130.2**	**8.9**				

CONSOLIDATION TESTS

CONSOLIDATION TEST

Sample ID : Boring DH - 1 S-1 Depth 8.5 - 10 ft.									
Material : (CL/ML) Dark brown sandy clay/sandy silt									
	Water Content, %	Total unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	17.1	105.6	0.868	53.1	1.00	2.416	(assumed) 2.70	-	-
Final	16.9	133.5	0.476	96.0	0.790				



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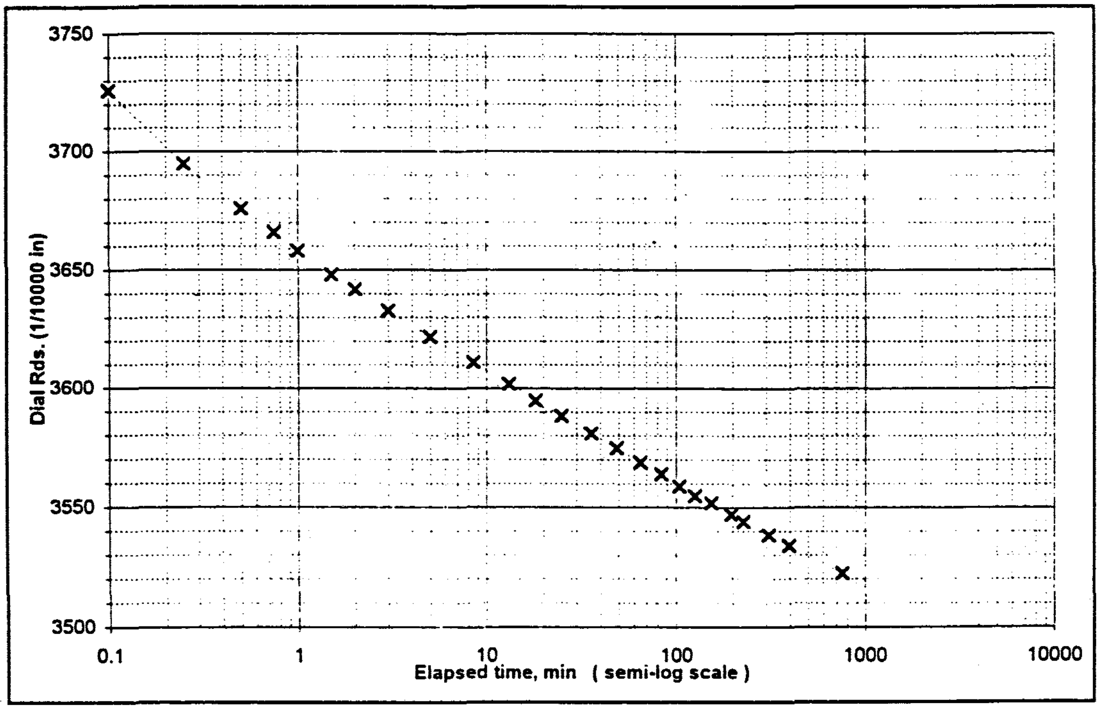
The rate of consolidation curve

Project: Thompson Creek
Job No: --
Spl ID: Boring DH - 1 S-1 Depth 8.5 - 10 ft.
Soil: (CL/ML) Dark brown sandy clay/sandy silt

Dial at zero load = 4362

Loading from 2000 to 4000 psf



T50= ________ min

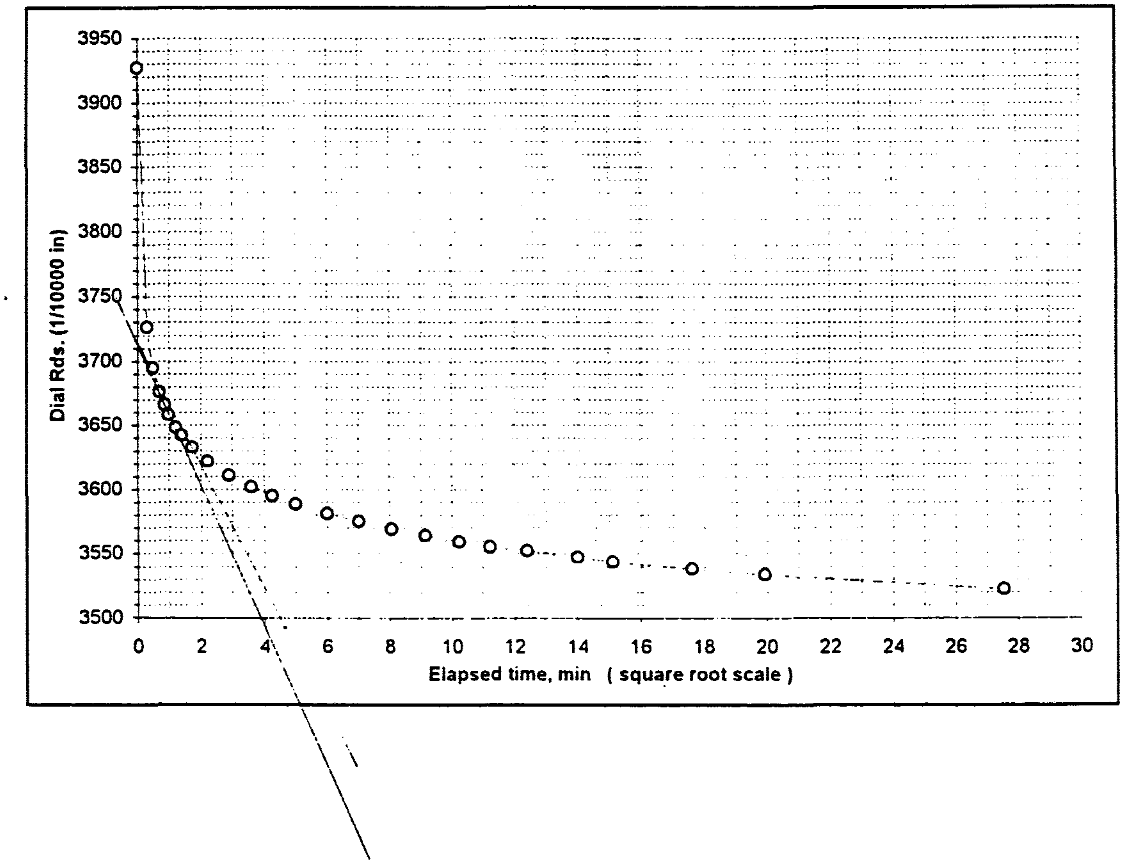
H = average height /2

= 0.4681 in

0.197*H*H

= 0.04317 sq in

Cv = ________ sq.ft./ yr



T90= 3.2 min

H = average height /2

= 0.4681 in

0.848*H*H

= 0.1858 sq in

Cv = 209.4 sq.ft./ yr

Signet Testing Labs

CONSOLIDATION TEST DATA

Project: Thompson Creek
Job No: --
Spl ID: Boring DH - 1 S-1 Depth 8.5 - 10 ft.
Soil: (CL/ML) Dark brown sandy clay/sandy silt

Sample type: Shelby
Load cycle:

Time rate at
Inundation at end of 500 psf

Test started: 12/13/98 by WL
Test finished: 12/19/98 by WL
Equip. #: SF-3

Moisture & Density Data

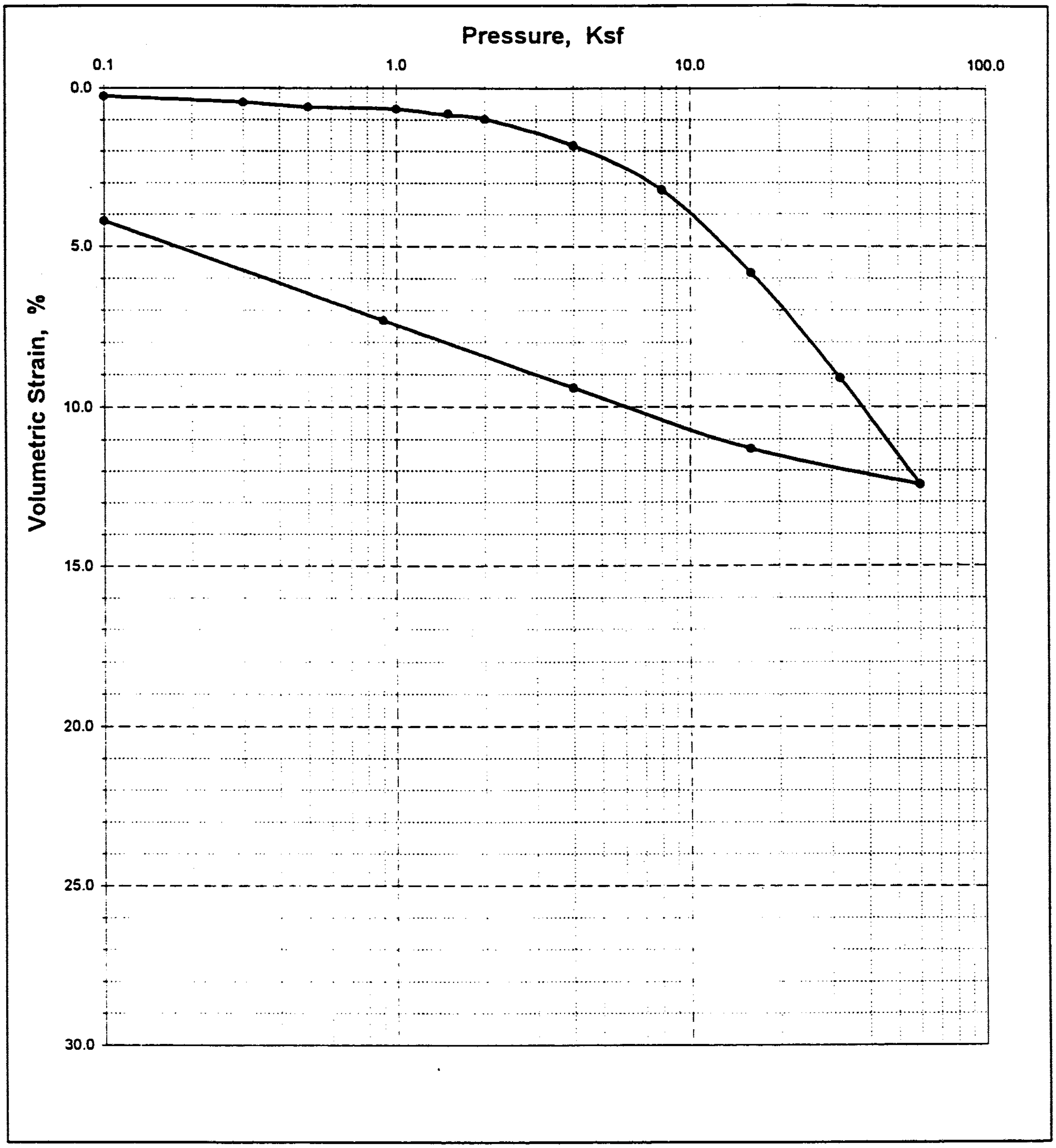
	Test specimen		M&D check
	Before	After	as received
Specimen height (in.)	1.00	0.790	3.50
Wt. of specimen + tare (gm)	172.0	171.9	752.0
Tare wt. (gm)	44.9	44.9	119.1
Diameter (in.)	2.416	2.416	2.855
Wet wt. of soil + dish wt. (gm)	172.0	171.9	261.7
Dry wt. of soil + dish wt. (gm)	153.5	153.5	230.7
Wt. of dish (gm)	44.9	44.9	43.0
Dish #	-	70	510
Wet Density (pcf)	105.6	133.5	107.5
Dry Density (pcf)	90.2	114.2	92.3
Moisture Content (%)	17.1	16.9	16.5
Gs (assumed)	2.70	--	--
e	0.868	0.476	0.825
S (%)	53.1	96.0	53.9
Vt (c.c.)	75.16	59.36	367.32
Vs (c.c.)	40.23	40.23	201.24
Vv (c.c.)	34.93	19.14	166.08

Volumetric Strain & Void Ratio Computation

Load (Ksf)	Dial Rds.	Ev (%)	Void Ratio
0	4362		
0.1	4342	0.20	0.86459
0.3	4315.5	0.47	0.860
0.5	4292	0.70	0.855
0.5	4273	0.89	0.852
1	4199	1.63	0.838
2	3927	4.35	0.787
4	3522.5	8.40	0.711
8	3179	11.83	0.647
16	2646	17.16	0.548
32	2230	21.32	0.470
64	1840	25.22	0.397
64	1840	25.22	0.397
16	1908	24.54	0.410
4	1980	23.82	0.423
1	2078	22.84	0.442
0.1	2261	21.01	0.476

CONSOLIDATION TEST

Sample ID : Boring DH - 2 S-1 Depth 5.6 - 7 ft.									
Material : (CL) Brown sandy clay w/ tr. fine gravel									
	Water Content, %	Total unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	19.8	126.6	0.623	87.2	1.00	2.416	(assumed) 2.75	-	-
Final	20.0	132.5	0.555	99.3	0.958				



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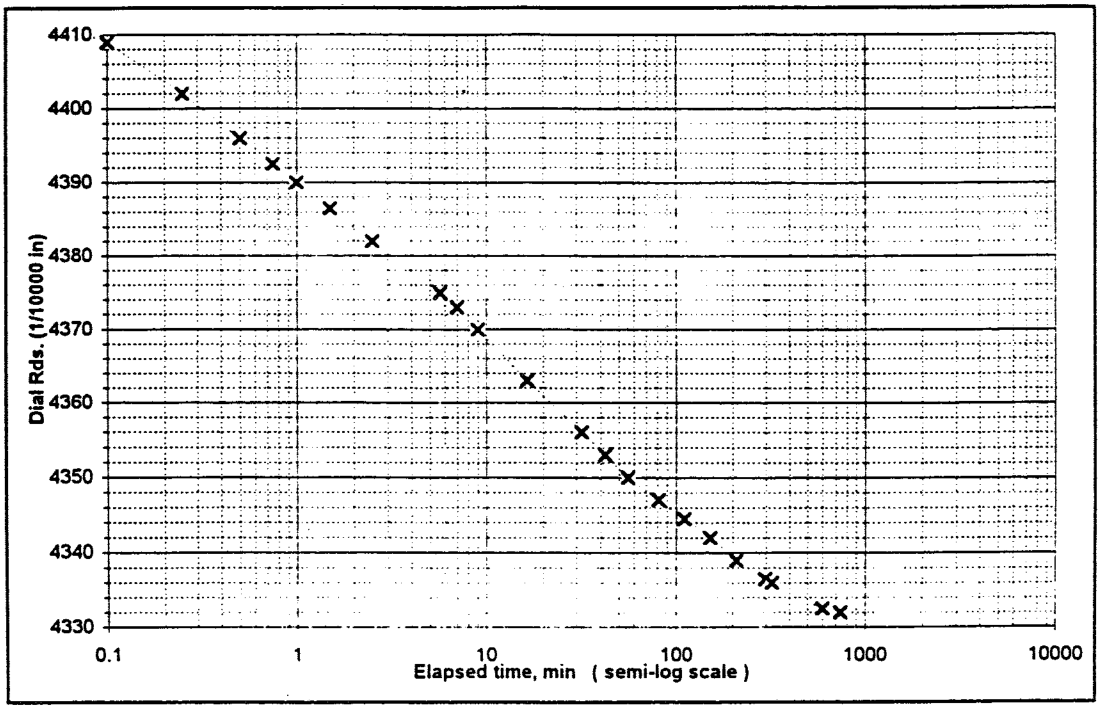
The rate of consolidation curve

Project: Thompson Creek
Job No: --
Spl ID: Boring DH - 2 S-1 Depth 5.6 - 7 ft.
Soil: (CL) Brown sandy clay w/ tr. fine gravel

Dial at zero load = 4653

Loading from 4000 to 8000 psf



T50= ______ min

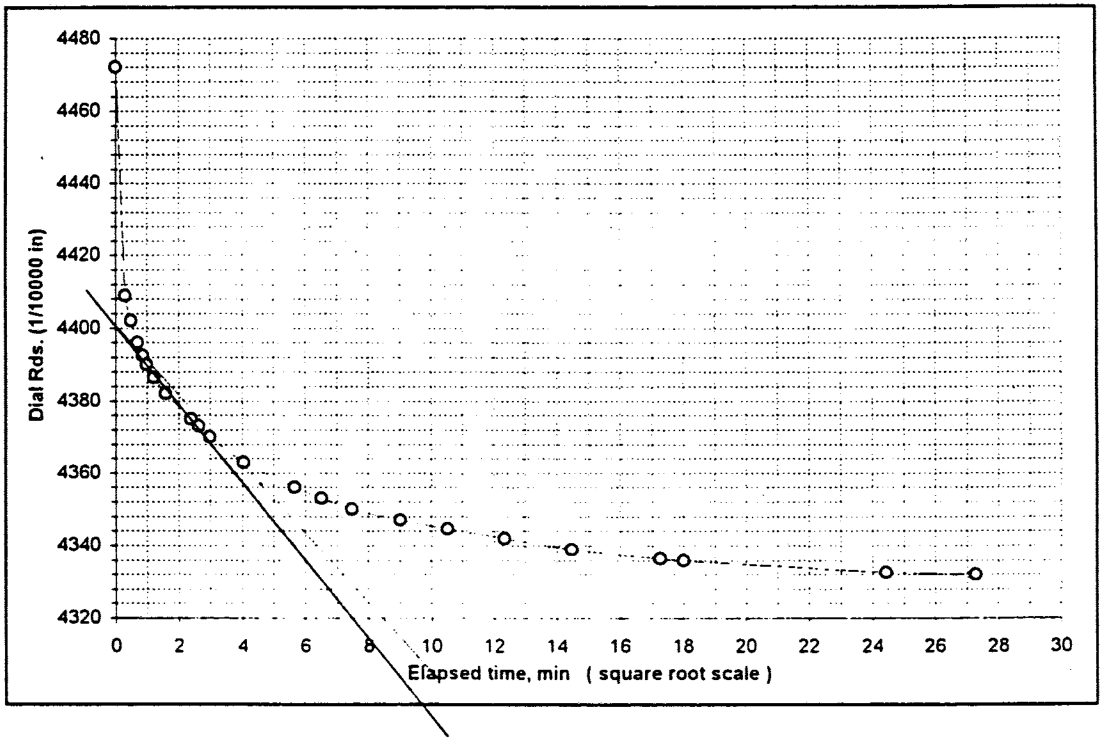
H = average height /2

= 0.4875 in

0.197*H*H

= 0.04681 sq in

Cv = ______ sq.ft./ yr



T90= 15.2 min

H = average height /2

= 0.4875 in

0.848*H*H

= 0.2015 sq in

Cv = 48.35 sq.ft./ yr

Signet Testing Labs

CONSOLIDATION TEST DATA

Project: Thompson Creek
Job No: --
Spl ID: Boring DH - 2 S-1 Depth 5.6 - 7 ft.
Soil: (CL) Brown sandy clay w/ tr. fine gravel
Note: Total recovery = 8 "

Sample type: Shelby
Load cycle:

Time rate at
Inundation at end of 500 psf

Test started: 12/10/98 by WL
Test finished: 12/17/98 by WL
Equip. #: SF-8

Moisture & Density Data

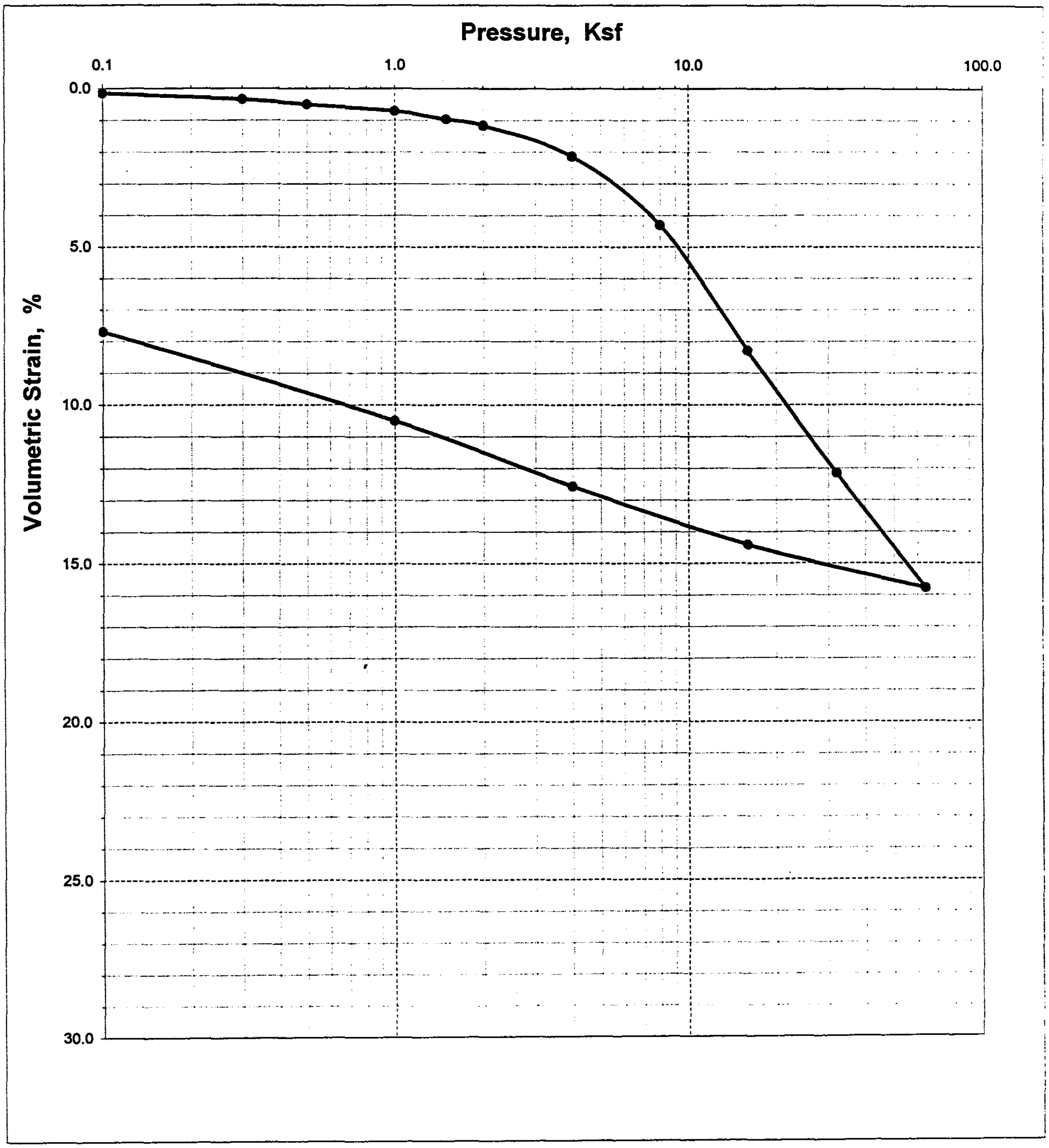
	Test specimen		M&D check as received
	Before	After	
Specimen height (in.)	1.00	0.958	
Wt. of specimen + tare (gm)	197.5	197.9	
Tare wt. (gm)	45.0	45.0	
Diameter (in.)	2.416	2.416	
Wet wt. of soil + dish wt. (gm)	197.5	197.9	
Dry wt. of soil + dish wt. (gm)	172.3	172.3	
Wt. of dish (gm)	45.0	45.0	
Dish #	-	510	
Wet Density (pcf)	126.6	132.5	
Dry Density (pcf)	105.7	110.4	
Moisture Content (%)	19.8	20.0	
Gs (assumed)	2.75	--	
e	0.623	0.555	
S (%)	87.2	99.3	
Vt (c.c.)	75.16	72.01	
Vs (c.c.)	46.31	46.31	
Vv (c.c.)	28.85	25.70	

Volumetric Strain & Void Ratio Computation

Load (Ksf)	Dial Rds.	Ev (%)	Void Ratio
0	4653		
0.1	4628	0.25	0.61884
0.3	4608	0.45	0.616
0.5	4593	0.60	0.613
1	4586.5	0.67	0.612
1.5	4572	0.81	0.610
2	4555	0.98	0.607
4	4472	1.81	0.594
8	4332	3.21	0.571
16	4070	5.83	0.528
32	3742	9.11	0.475
60	3409	12.44	0.421
60	3409	12.44	0.421
16	3523	11.30	0.440
4	3713	9.40	0.470
0.9	3922	7.31	0.504
0.1	4234	4.19	0.555

CONSOLIDATION TEST

Sample ID : Boring DH - 4 Sample S - 3 Depth 19 - 21 ft.									
Material : (CH/CL) Brown clay									
	Water Content, %	Total unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	21.3	125.6	0.657	89.0	1.00	2.416	(assumed) 2.75	-	-
Final	19.7	134.3	0.530	102.2	0.923				

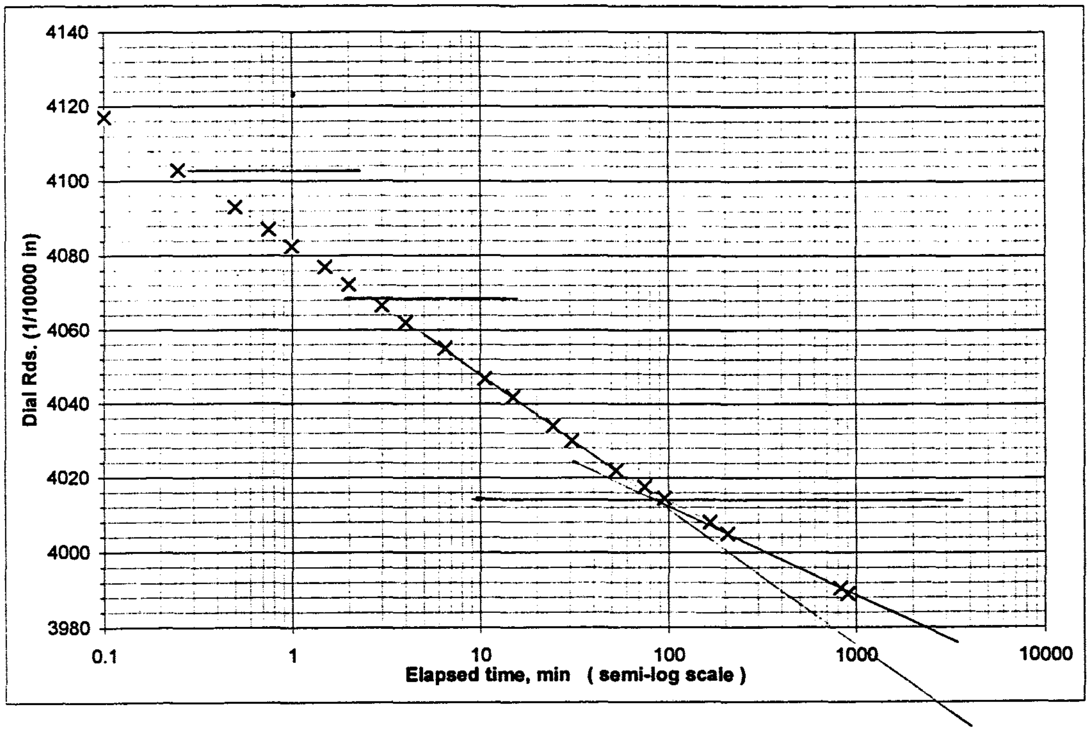


The rate of consolidation curve

Project: Tfhompson Creek
Job No: –
Spl ID: Boring DH - 4 Sample S - 3 Depth 19 - 21 ft.
Soil: (CH/CL) Brown clay

Dial at zero load = 4420

Loading from 4000 to 8000 psf



T50= 2.6 min

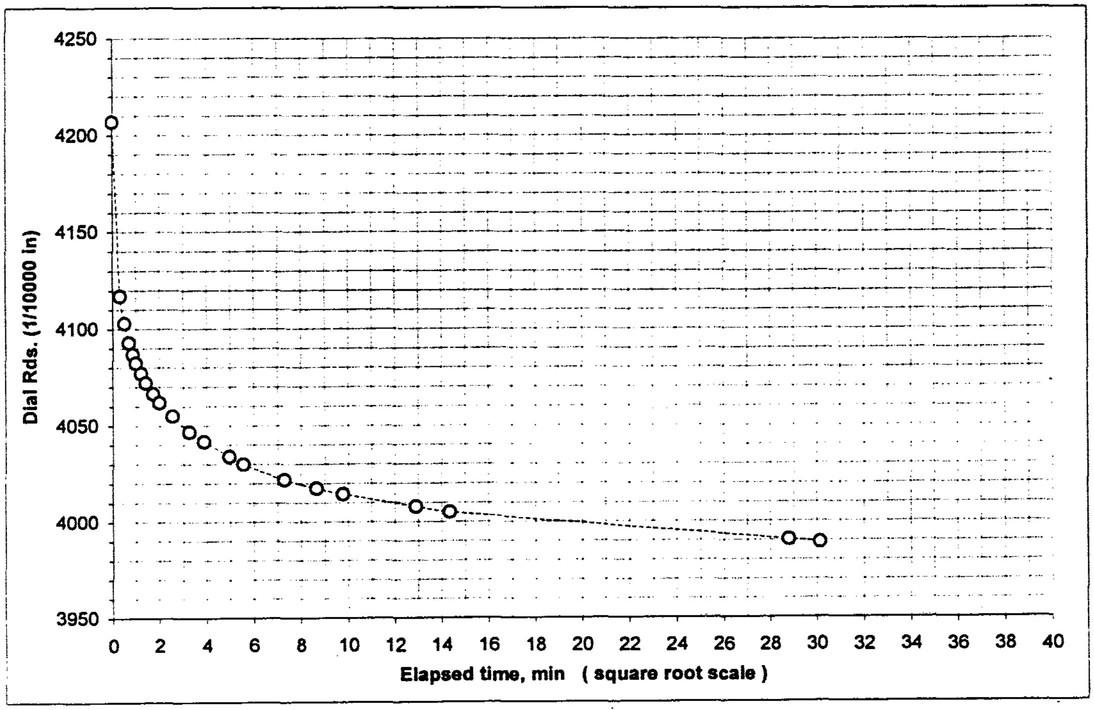
H = average height /2

= 0.4839 in

0.197*H*H

= 0.04613 sq in

Cv = 64.76 sq.ft./ yr



T90= ________ min

H = average height /2

= 0.4839 in

0.848*H*H

= 0.1986 sq in

Cv = ________ sq.ft./ yr

Signet Testing Labs

Page 3 of 5

CONSOLIDATION TEST DATA

Project: Tfhompson Creek
Job No: --
Spl ID: Boring DH - 4 Sample S - 3 Depth 19 - 21 ft.
Soil: (CH/CL) Brown clay

Sample type: Shelby
Load cycle:

Time rate at
Inundation at end of 500 psf

Test started: 1/4/99 by WL
Test finished: 1/9/99 by WL
Equip. #: SF-6

Moisture & Density Data

	Test specimen		M&D check
	Before	After	as received
Specimen height (in.)	1.00	0.923	5.01
Wt. of specimen + tare (gm)	196.5	194.5	1210.7
Tare wt. (gm)	45.2	45.2	120.8
Diameter (in.)	2.416	2.416	2.881
Wet wt. of soil + dish wt. (gm)	196.5	194.5	486.3
Dry wt. of soil + dish wt. (gm)	169.9	169.9	414.6
Wt. of dish (gm)	45.2	45.2	84.6
Dish #	-	510	510+548
Wet Density (pcf)	125.6	134.3	127.0
Dry Density (pcf)	103.5	112.2	104.3
Moisture Content (%)	21.3	19.7	21.7
Gs (assumed)	2.75	--	--
e	0.657	0.530	0.645
S (%)	89.0	102.2	92.7
Vt (c.c.)	75.16	69.38	535.41
Vs (c.c.)	45.35	45.35	325.56
Vv (c.c.)	29.81	24.03	209.85

Volumetric Strain & Void Ratio Computation

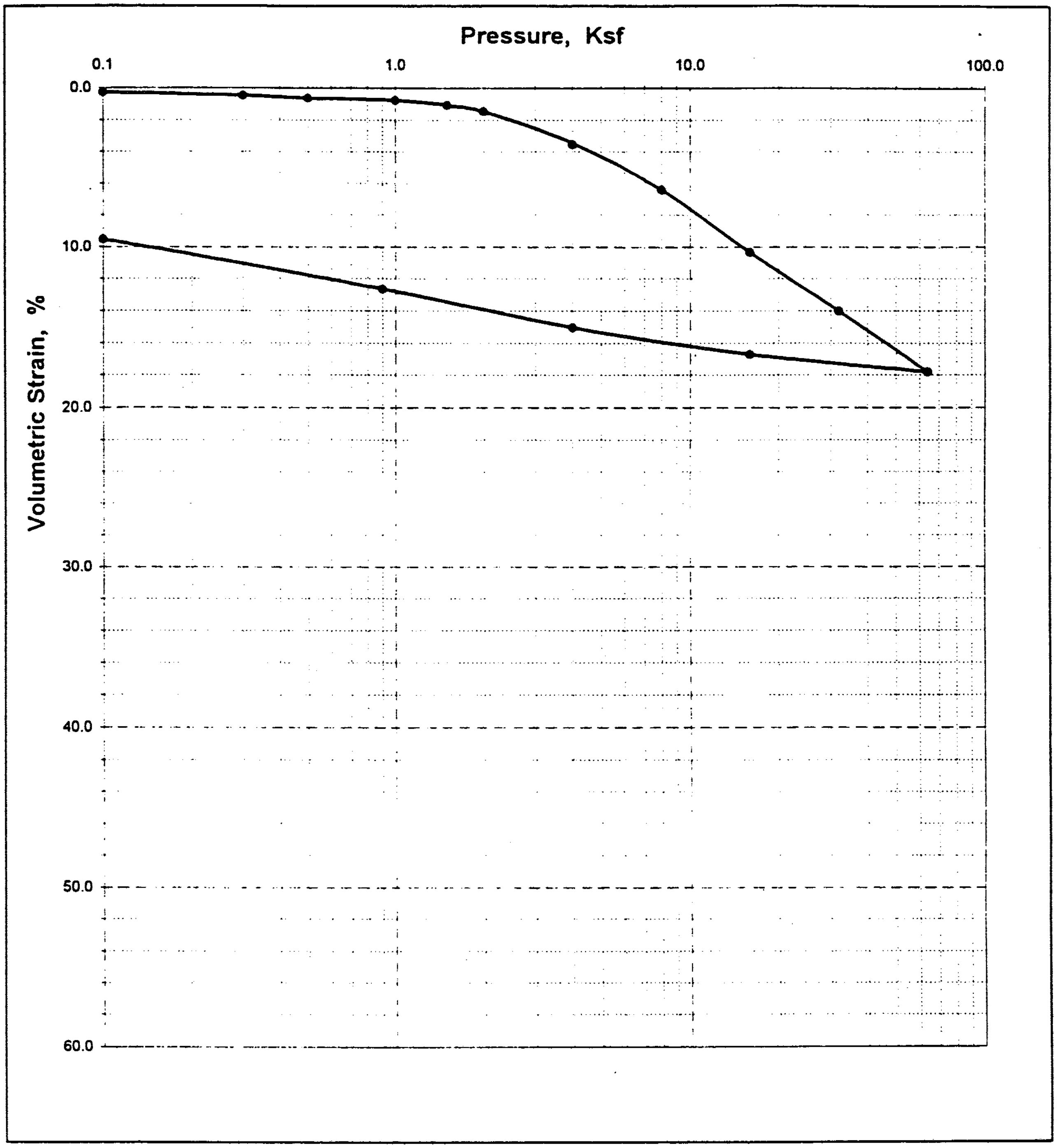
Load (Ksf)	Dial Rds.	Ev (%)	Void Ratio
0	4420		
0.1	4405	0.15	0.65477
0.3	4386	0.34	0.652
0.5	4370	0.50	0.649
1	4349.5	0.71	0.646
1.5	4323	0.97	0.641
2	4303	1.17	0.638
4	4207	2.13	0.622
8	3989	4.31	0.586
16	3591	8.29	0.520
32	3205	12.15	0.456
64	2842	15.78	0.396
64	2842	15.78	0.396
16	2978	14.42	0.418
4	3163	12.57	0.449
1	3370	10.50	0.483
0.1	3651	7.69	0.530

CONSOLIDATION TEST

Sample ID : Boring DH - 10 S-3 Depth 13.5 - 15 ft.

Material : (CL) Brown sandy clay

	Water Content, %	Total unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	21.1	122.0	0.673	84.6	1.00	2.416	(assumed) 2.70	-	-
Final	19.0	132.5	0.514	99.9	0.905				



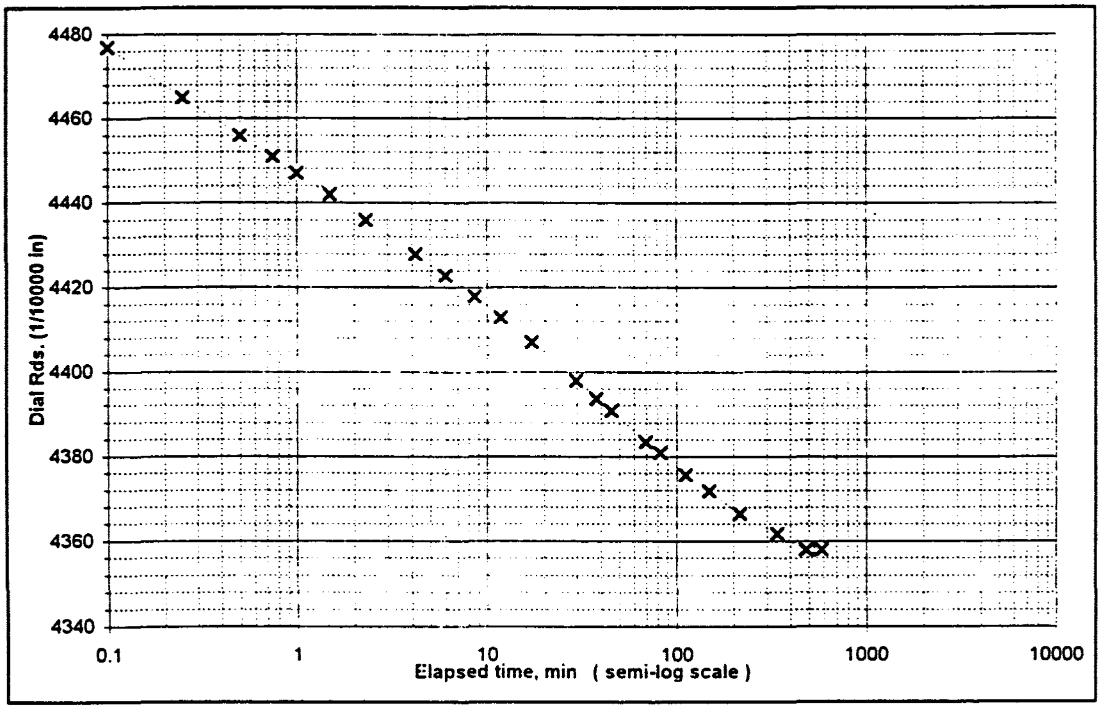
Thompson Creek

The rate of consolidation curve

Project: Thompson Creek
Job No: Thompson Creek
Spl ID: Boring DH - 10 S-3 Depth 13.5 - 15 ft.
Soil: (CL) Brown sandy clay

Dial at zero load = 4712

Loading from 2000 to 4000 psf



T50= ______ min

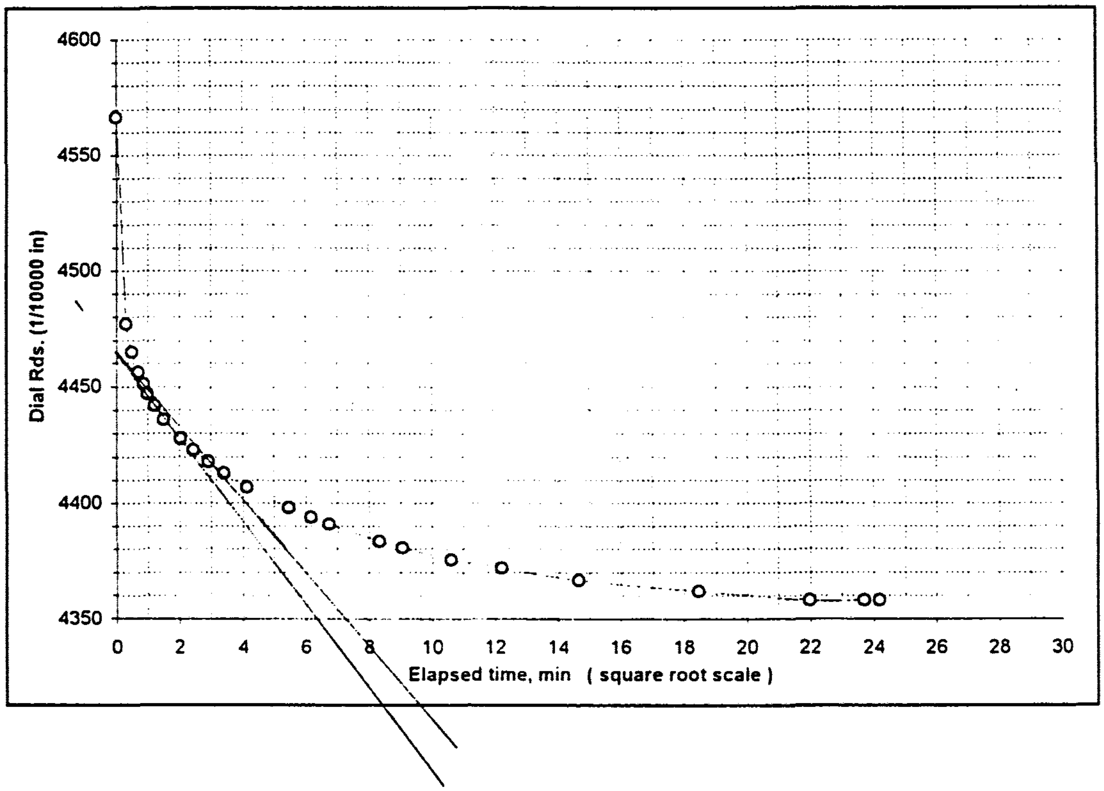
H = average height /2

= 0.4875 in

0.197*H*H

= 0.04682 sq in

Cv = ______ sq.ft./ yr



T90= 9.6 min

H = average height /2

= 0.4875 in

0.848*H*H

= 0.2015 sq in

Cv = 76.55 sq.ft./ yr

Signet Testing Labs

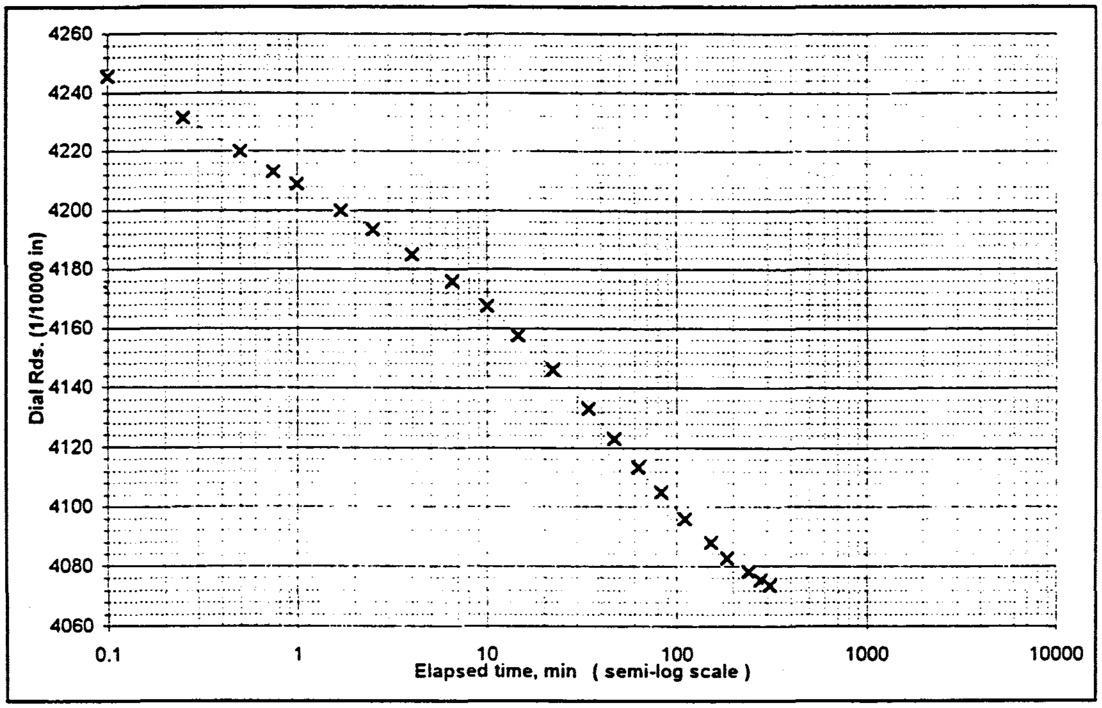
Page 3 of 7

The rate of consolidation curve

Project: Thompson Creek
Job No: Thompson Creek
Spl ID: Boring DH - 10 S-3 Depth 13.5 - 15 ft.
Soil: (CL) Brown sandy clay

Dial at zero load = 4712

Loading from 4000 to 8000 psf



T50= ________ min

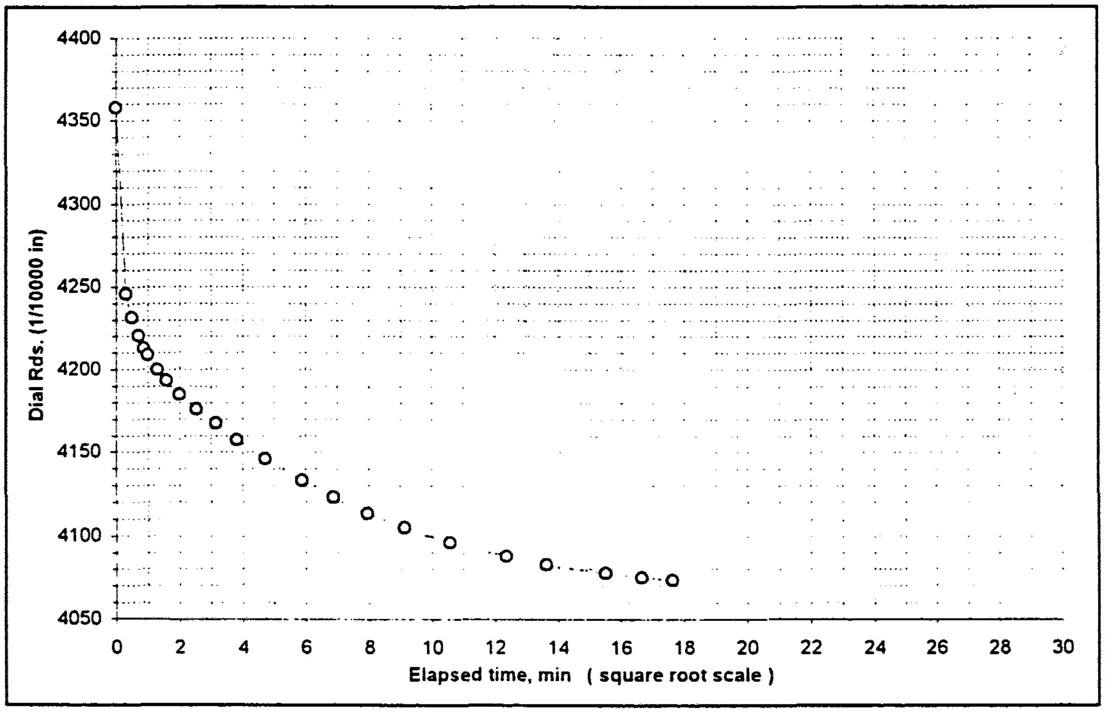
H = average height /2

= 0.4752 in

0.197*H*H

= 0.04448 sq in

Cv = ________ sq.ft./ y



T90= ________ min

H = average height /2

= 0.4752 in

0.848*H*H

= 0.1915 sq in

Cv = ________ sq.ft./ y

CONSOLIDATION TEST DATA

Project: Thompson Creek
Job No: Thompson Creek
Spl ID: Boring DH - 10 S-3 Depth 13.5 - 15 ft.
Soil: (CL) Brown sandy clay

Sample type: Shelby
Load cycle:

Time rate at
Inundation at end of 500 psf

Test started: 12/12/98 by WL
Test finished: 12/17/98 by WL
Equip. #: SF-5

Moisture & Density Data

	Test specimen		M&D check as received
	Before	After	
Specimen height (in.)	1.00	0.905	
Wt. of specimen + tare (gm)	192.3	189.8	
Tare wt. (gm)	45.4	45.4	
Diameter (in.)	2.416	2.416	
Wet wt. of soil + dish wt. (gm)	192.3	189.8	
Dry wt. of soil + dish wt. (gm)	166.7	166.7	
Wt. of dish (gm)	45.4	45.4	
Dish #	-	113	
Wet Density (pcf)	122.0	132.5	
Dry Density (pcf)	100.7	111.3	
Moisture Content (%)	21.1	19.0	
Gs (assumed)	2.70	--	
e	0.673	0.514	
S (%)	84.6	99.9	
Vt (c.c.)	75.16	68.00	
Vs (c.c.)	44.93	44.93	
Vv (c.c.)	30.23	23.07	

Volumetric Strain & Void Ratio Computation

Load (Ksf)	Dial Rds.	Ev (%)	Void Ratio
0	4712		
0.1	4686	0.26	0.66852
0.3	4665	0.47	0.665
0.5	4650	0.62	0.662
1	4636	0.76	0.660
1.5	4608	1.04	0.655
2	4566.5	1.46	0.649
4	4358	3.54	0.614
8	4073.5	6.39	0.566
16	3677	10.35	0.500
32	3313	13.99	0.439
64	2932.5	17.80	0.375
64	2932.5	17.80	0.375
16	3043	16.69	0.394
4	3210	15.02	0.422
0.9	3450	12.62	0.462
0.1	3760	9.52	0.514

UNCONFINED COMPRESSION TESTS

UNCONFINED COMPRESSION TEST - Uc

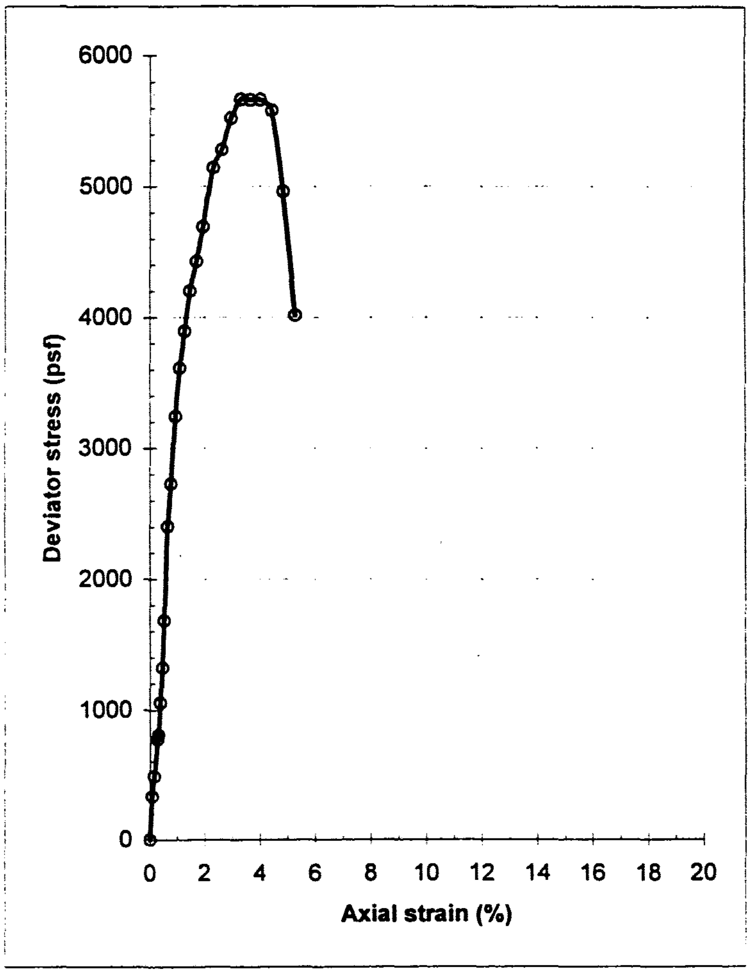
Client : –
Project : Thompson Creek
Job # : –
Boring # : DH - 3
Sample # : L 1a
Depth (ft) : 6.0 - 6.5
Date tested : 12/17/98
Soil : (CL) Dk brown gravelly clay

Specimen:
Total wt. = 875.4 gms
Ht. = 5.49 in
Ave dia. = 2.414 in
Area = 4.579 sq.in
Volume = 411.9 c.c.
Moisture = 13.4 %
Total density = 132.6 pcf
Dry density = 116.9 pcf

Dial factor = 0.000300 in/unit
Load factor = 0.123859 lb/unit
Shearing rate = 0.05 in/min

Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
295	170	0.00	0.0
312	256	0.09	334.7
327	295	0.17	486.1
347	369	0.28	773.0
353	378	0.32	807.7
367	442	0.39	1055.4
379	511	0.46	1322.2
393	605	0.53	1685.4
416	791	0.66	2403.1
437	876	0.78	2728.8
467	1011	0.94	3245.3
497	1108	1.10	3613.6
528	1183	1.27	3895.8
565	1265	1.47	4202.6
605	1327	1.69	4430.7
651	1399	1.94	4694.4
718	1522	2.31	5144.9
776	1563	2.63	5283.8
838	1632	2.96	5526.2
901	1675	3.31	5668.6
963	1679	3.65	5663.8
1028	1685	4.00	5665.4
1107	1670	4.43	5584.1
1185	1509	4.86	4962.5
1264	1259	5.29	4017.7

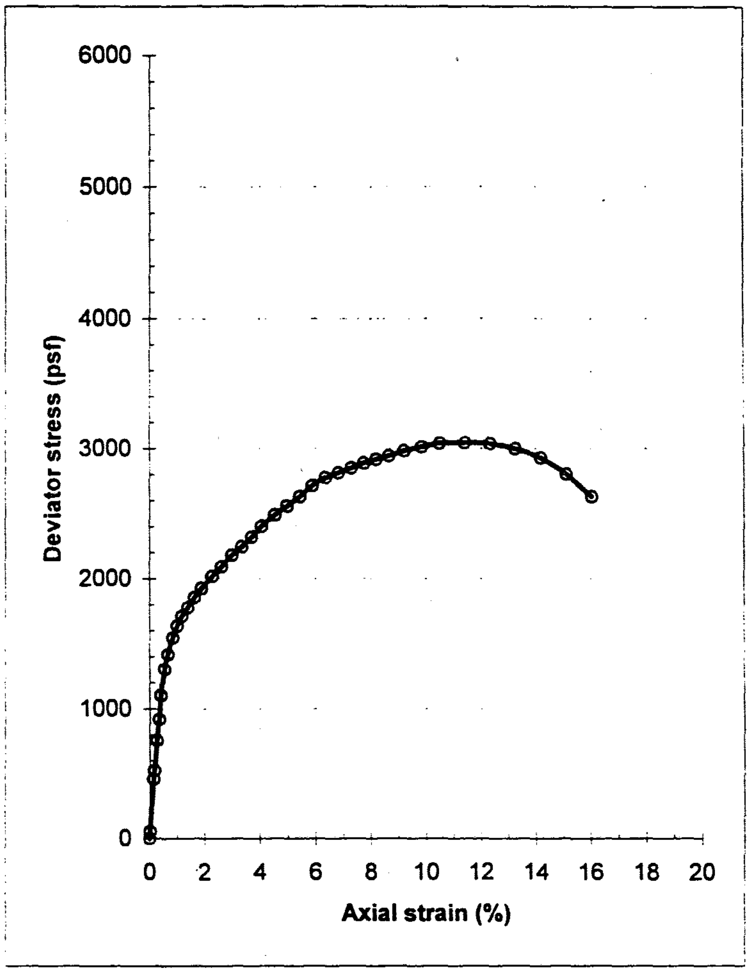


UNCONFINED COMPRESSION TEST - Uc

Client : –
Project : Thompson Creek
Job # : –
Boring # : DH - 3
Sample # : L 2b
Depth (ft) : 20.5 - 21
Date tested : 12/17/98
Soil : (CL) Brown clay w/ tr. fine gravel

Specimen:
Total wt. = 820.7 gms
Ht. = 5.17 in
Ave dia. = 2.399 in
Area = 4.522 sq.in
Volume = 383.1 c.c.
Moisture = 17.1 %
Total density = 133.7 pcf
Dry density = 114.2 pcf

Dial factor = 0.000300 in/unit
Load factor = 0.123859 lb/unit
Shearing rate = 0.05 in/min



Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
237	169	0.00	0.0
241	183	0.02	55.2
263	285	0.15	456.8
269	302	0.19	523.6
283	362	0.27	759.2
296	404	0.34	923.7
309	450	0.42	1103.7
331	501	0.54	1302.4
353	531	0.67	1418.2
382	564	0.84	1544.9
410	588	1.00	1636.1
441	608	1.18	1711.0
478	626	1.40	1777.3
517	647	1.62	1854.8
563	667	1.89	1927.1
631	693	2.28	2019.6
689	714	2.62	2093.3
751	739	2.98	2181.2
814	758	3.34	2245.5
877	780	3.71	2320.5
941	804	4.08	2402.4
1019	830	4.53	2489.0
1095	851	4.97	2556.2
1173	874	5.43	2629.8
1253	900	5.89	2713.4
1332	920	6.35	2774.1
1412	934	6.81	2811.8
1492	948	7.28	2849.0
1571	962	7.73	2885.9
1650	974	8.19	2915.0
1730	986	8.65	2943.6
1825	1001	9.21	2979.5
1935	1016	9.84	3011.9
2046	1030	10.49	3039.9
2204	1040	11.40	3043.7
2363	1047	12.32	3036.3
2523	1045	13.25	2997.3
2683	1034	14.18	2928.0
2844	1006	15.11	2802.4
3005	963	16.05	2629.2

UNCONFINED COMPRESSION TEST - Uc

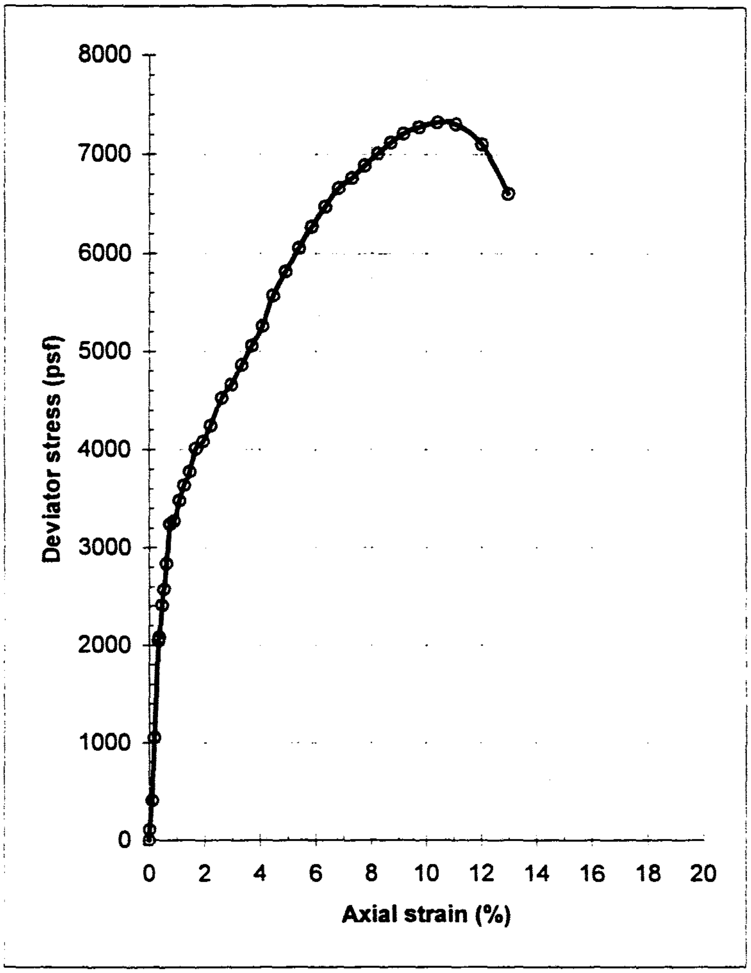
Client : –
Project : Thompson Creek
Job # : –
Boring # : DH - 5
Sample # : L 1a
Depth (ft) : 11 - 11.5
Date tested : 12/19/98
Soil : (CH) Brown fat clay w/ tr. fine gravel

Specimen:
Total wt. = 807.6 gms
Ht. = 5.02 in
Ave dia. = 2.403 in
Area = 4.537 sq.in
Volume = 373.2 c.c.
Moisture = 15.6 %
Total density = 135.0 pcf
Dry density = 116.8 pcf

Dial factor = 0.000300 in/unit
Load factor = 0.123859 lb/unit
Shearing rate = 0.05 in/min

Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
519	169	0.00	0.0
523	197	0.02	110.0
538	273	0.11	408.4
553	438	0.20	1055.3
576	692	0.34	2049.0
582	701	0.38	2083.5
597	785	0.47	2410.3
610	828	0.54	2576.5
625	896	0.63	2839.8
648	1000	0.77	3241.6
671	1010	0.91	3276.1
702	1065	1.09	3483.8
733	1106	1.28	3636.4
764	1144	1.46	3776.8
803	1207	1.70	4011.3
843	1228	1.93	4082.5
890	1273	2.21	4243.8
957	1351	2.61	4525.1
1016	1391	2.97	4661.3
1078	1449	3.34	4863.9
1140	1505	3.71	5057.3
1203	1563	4.08	5256.2
1267	1652	4.47	5569.5
1344	1725	4.93	5815.6
1423	1797	5.40	6054.5
1500	1864	5.86	6273.0
1581	1927	6.34	6472.8
1660	1986	6.81	6656.3
1740	2025	7.29	6764.3
1819	2069	7.76	6889.5
1899	2112	8.24	7008.9
1977	2153	8.70	7120.5
2056	2188	9.18	7208.7
2151	2219	9.74	7273.6
2262	2248	10.41	7322.4
2373	2259	11.07	7306.7
2533	2223	12.02	7103.7
2694	2100	12.99	6605.3

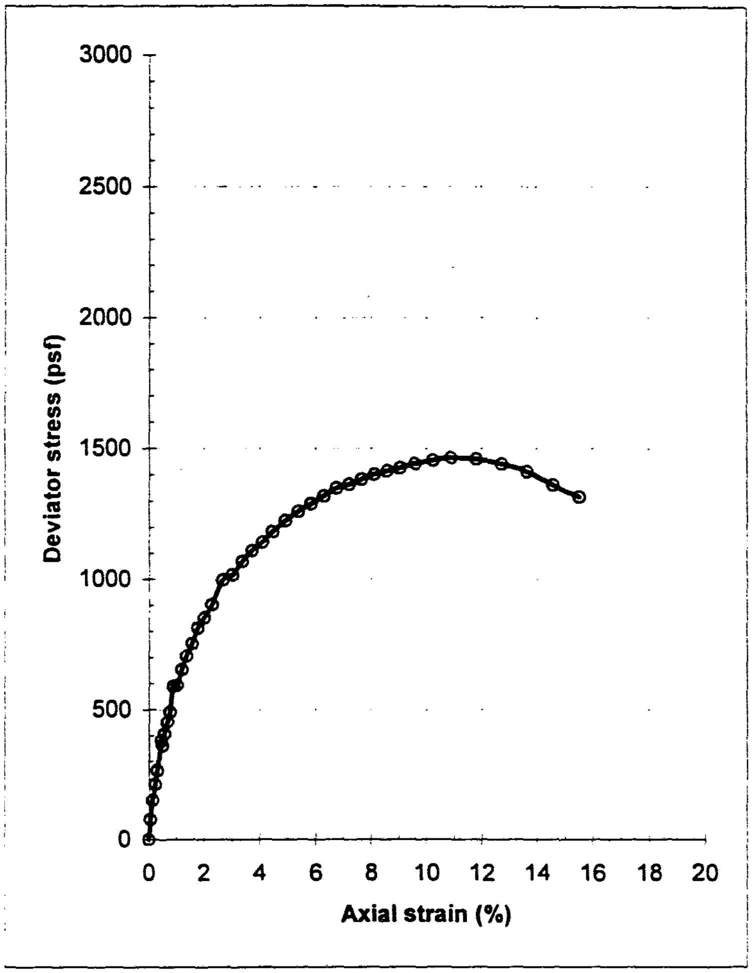


UNCONFINED COMPRESSION TEST - Uc

Client : –
Project : Thompson Creek
Job # : –
Boring # : DH - 5
Sample # : L 2b
Depth (ft) : 19.5 - 20
Date tested : 12/19/98
Soil : (CL) Brown clay w/ tr. fine gravel

Specimen:
Total wt. = 842.9 gms
Ht. = 5.16 in
Ave dia. = 2.422 in
Area = 4.609 sq.in
Volume = 389.7 c.c.
Moisture = 16.7 %
Total density = 135.0 pcf
Dry density = 115.6 pcf

Dial factor = 0.000300 in/unit
Load factor = 0.123859 lb/unit
Shearing rate = 0.05 in/min



Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
314	171	0.00	0.0
323	191	0.05	77.4
338	210	0.14	150.7
353	226	0.23	212.4
367	240	0.31	266.2
391	270	0.45	381.4
397	265	0.48	362.0
412	277	0.57	407.9
428	289	0.66	453.6
443	299	0.75	491.6
467	325	0.89	590.6
488	326	1.01	593.7
519	342	1.19	653.8
550	356	1.37	706.1
581	369	1.55	754.3
619	385	1.77	813.4
659	396	2.00	853.2
706	410	2.28	903.8
773	436	2.67	998.1
830	442	3.00	1017.3
891	457	3.35	1069.6
954	469	3.72	1110.3
1017	479	4.08	1143.2
1081	491	4.45	1183.1
1159	504	4.91	1225.4
1238	515	5.37	1259.7
1316	525	5.82	1290.1
1396	535	6.28	1320.0
1476	545	6.75	1349.6
1555	551	7.21	1364.5
1633	558	7.66	1382.8
1712	565	8.12	1400.9
1791	571	8.58	1415.1
1870	576	9.04	1425.6
1965	583	9.59	1441.4
2077	590	10.24	1455.4
2188	596	10.88	1465.6
2345	599	11.80	1460.9
2503	598	12.71	1442.3
2663	594	13.64	1413.6
2824	583	14.58	1361.9
2986	574	15.52	1317.5

UNCONFINED COMPRESSION TEST - Uc

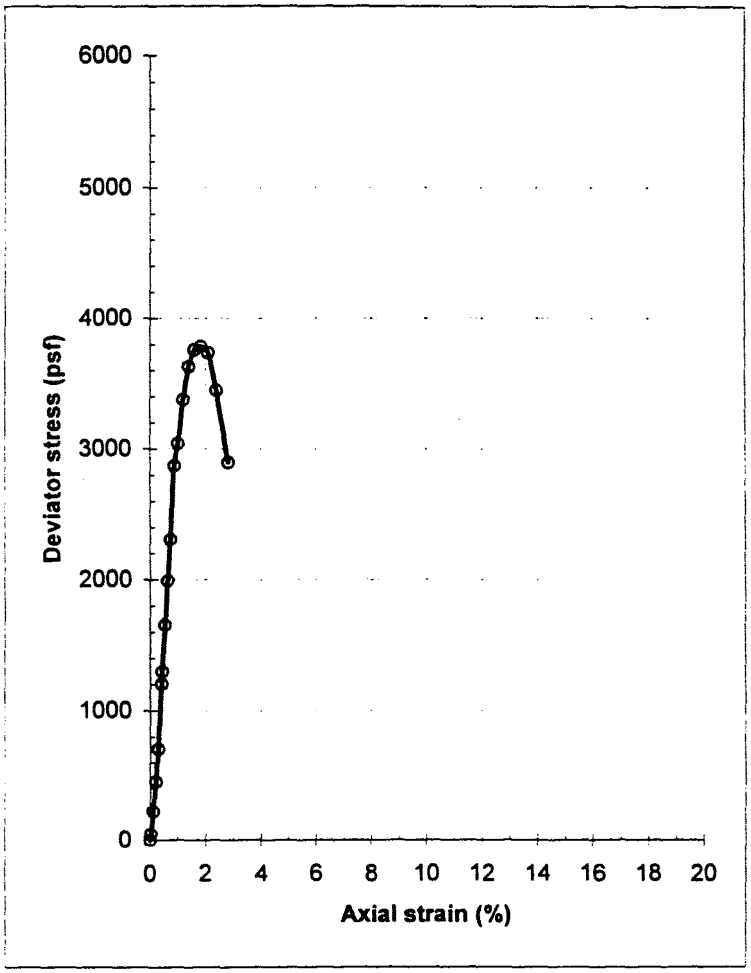
Client : –
Project : Thompson Creek
Job # : –
Boring # : DH - 7
Sample # : L 1b
Depth (ft) : 9 - 9.5
Date tested : 12/17/98
Soil : (CL) Brown clay w/ tr. fine gravel & sand

Specimen:

Total wt.	=	664.1	gms
Ht.	=	4.75	in
Ave dia.	=	2.411	in
Area	=	4.567	sq.in
Volume	=	355.5	c.c.
Moisture	=	11.3	%
Total density	=	116.6	pcf
Dry density	=	104.7	pcf
Dial factor	=	0.000300	in/unit
Load factor	=	0.123859	lb/unit
Shearing rate	=	0.05	in/min

Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
403	171	0.00	0.0
406	183	0.02	46.9
421	228	0.11	222.3
436	287	0.21	452.0
449	352	0.29	704.8
468	481	0.41	1205.6
473	505	0.44	1298.5
488	597	0.54	1654.6
503	685	0.63	1994.5
518	766	0.73	2306.7
541	913	0.87	2872.3
564	958	1.02	3042.1
594	1047	1.21	3379.6
625	1114	1.40	3630.9
655	1149	1.59	3758.5
693	1158	1.83	3783.8
733	1148	2.08	3735.8
780	1076	2.38	3450.0
848	935	2.81	2899.7

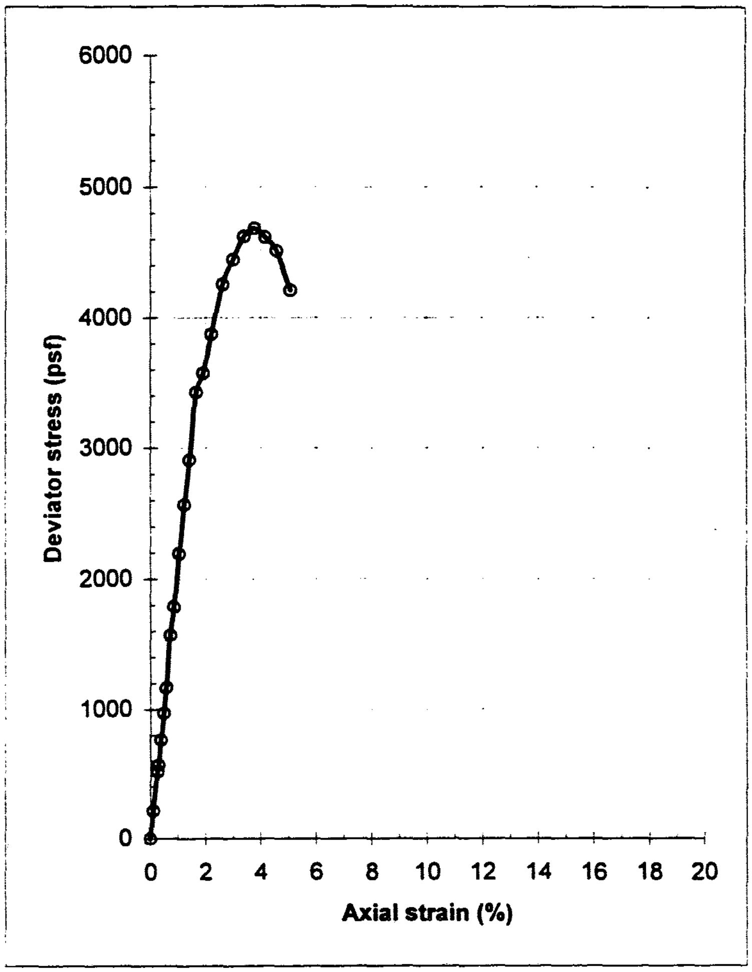


UNCONFINED COMPRESSION TEST - Uc

Client : –
Project : Thompson Creek
Job # : –
Boring # : DH - 9
Sample # : L 3b
Depth (ft) : 10.5 - 11
Date tested : 12/19/98
Soil : (CK) Dk brown fat clay

Specimen:

Total wt. =	657.5	gms
Ht. =	4.76	in
Ave dia. =	2.401	in
Area =	4.529	sq.in
Volume =	353.3	c.c.
Moisture =	25.9	%
Total density =	116.1	pcf
Dry density =	92.3	pcf
Dial factor =	0.000300	in/unit
Load factor =	0.123859	lb/unit
Shearing rate =	0.05	in/min



Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
451	170	0.00	0.0
467	225	0.10	216.4
492	302	0.26	518.4
498	315	0.30	569.3
513	365	0.39	764.9
528	418	0.48	971.8
543	468	0.58	1166.6
566	572	0.72	1571.5
588	629	0.86	1791.8
618	733	1.05	2193.6
647	830	1.23	2566.8
677	919	1.42	2907.4
715	1055	1.66	3426.9
755	1095	1.91	3572.6
802	1176	2.21	3873.8
869	1280	2.63	4255.8
927	1334	3.00	4446.1
990	1385	3.39	4621.9
1051	1406	3.78	4683.1
1114	1394	4.17	4618.5
1178	1371	4.58	4512.7
1257	1297	5.07	4212.6

UNCONFINED COMPRESSION TEST - Uc

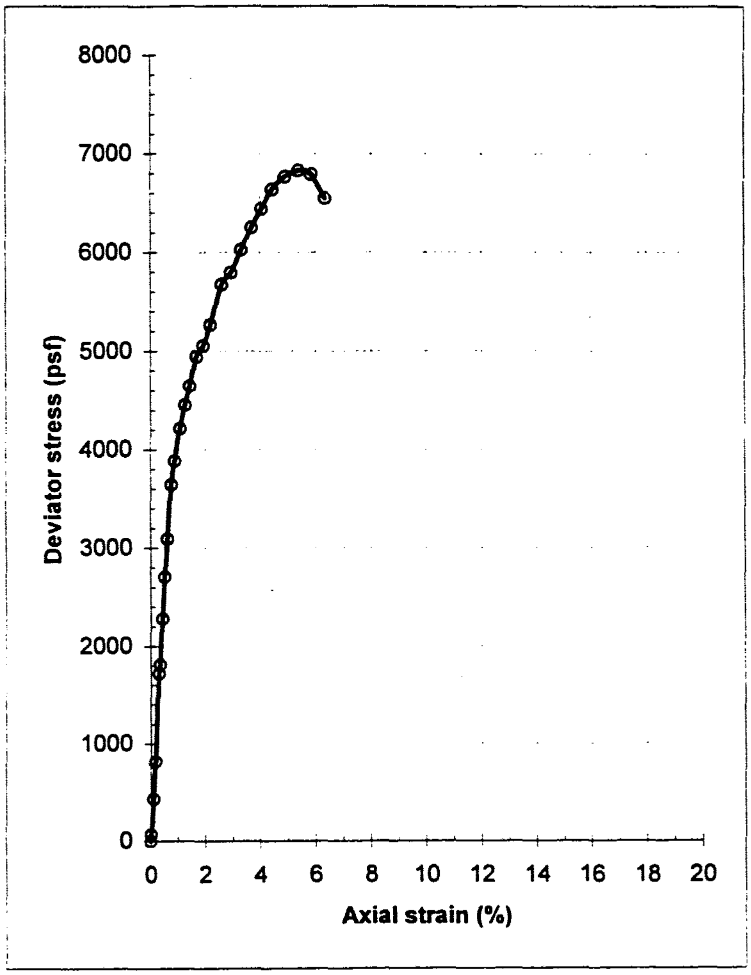
Client :	–
Project :	Thompson Creek
Job # :	–
Boring # :	DH - 12
Sample # :	L 1b
Depth (ft) :	3 - 3.5
Date tested :	12/19/98
Soil :	(CL) Brown gravelly clay

Specimen:

Total wt.	=	826.3	gms
Ht.	=	5.01	in
Ave dia.	=	2.413	in
Area	=	4.575	sq.in
Volume	=	375.6	c.c.
Moisture	=	9.6	%
Total density	=	137.3	pcf
Dry density	=	125.2	pcf
Dial factor	=	0.000300	in/unit
Load factor	=	0.123859	lb/unit
Shearing rate	=	0.05	in/min

Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
471	171	0.00	0.0
475	189	0.02	70.2
489	282	0.11	432.3
501	380	0.18	813.3
523	613	0.31	1717.8
530	637	0.35	1810.3
544	759	0.44	2282.4
559	869	0.53	2706.9
575	969	0.62	3091.7
598	1113	0.76	3644.6
621	1176	0.90	3883.0
652	1264	1.08	4215.0
683	1328	1.27	4453.5
714	1380	1.45	4644.9
752	1461	1.68	4944.7
793	1493	1.93	5054.7
839	1552	2.20	5265.5
906	1665	2.60	5673.0
964	1702	2.95	5792.8
1026	1769	3.32	6023.2
1088	1835	3.69	6247.9
1150	1893	4.06	6440.7
1215	1952	4.45	6634.4
1293	1996	4.92	6765.1
1371	2022	5.38	6827.8
1450	2021	5.86	6790.0
1532	1964	6.35	6546.6



Signet Testing Labs

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TESTS

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - TXUU

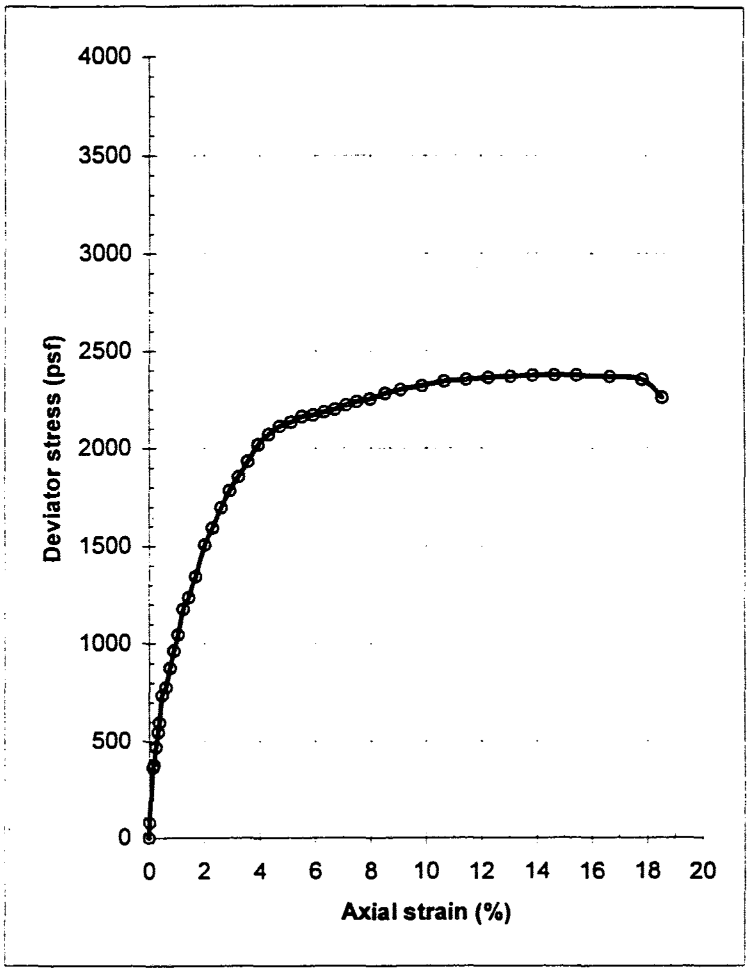
Client : –
Project : Thompson Creek
Job # : –
Boring # : DH - 2
Sample # : S - 2
Depth (ft) : 12 - 14
Date tested : 12-98
Soil : (CL) Brown silty clay

Specimen:
Total wt. = 1333.7 gms
Ht. = 6.01 in
Ave dia. = 2.882 in
Area = 6.526 sq.in
Volume = 642.7 c.c.
Moisture = 18.7 %
Total density = 129.5 pcf
Dry density = 109.1 pcf

Dial factor = 0.000300 in/unit
Load factor = 0.123859 lb/unit
Shearing rate = 0.05 in/min
SigC = 1440 psf

Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
361	185	0.00	0.0
366	214	0.02	79.2
390	318	0.14	363.0
396	323	0.17	376.5
411	357	0.25	468.9
426	385	0.32	544.8
437	404	0.38	596.3
458	456	0.48	737.1
481	471	0.60	777.0
511	508	0.75	876.2
541	541	0.90	964.2
572	572	1.05	1046.5
610	621	1.24	1176.8
650	644	1.44	1236.4
697	685	1.68	1343.6
764	747	2.01	1505.1
822	781	2.30	1591.4
885	822	2.61	1695.4
947	857	2.92	1782.9
1010	886	3.24	1853.8
1074	918	3.56	1932.1
1151	954	3.94	2018.9
1229	977	4.33	2070.8
1307	996	4.72	2111.9
1388	1008	5.12	2134.1
1467	1022	5.52	2161.3
1547	1029	5.91	2170.2
1626	1039	6.31	2186.7
1706	1048	6.71	2200.4
1785	1060	7.10	2221.5
1864	1070	7.49	2237.4
1959	1081	7.97	2253.6
2069	1097	8.52	2280.2
2181	1111	9.08	2301.1
2339	1127	9.86	2320.5
2499	1145	10.66	2343.9
2659	1157	11.46	2352.0
2820	1171	12.26	2364.3
2980	1182	13.06	2368.9
3141	1194	13.86	2375.3
3301	1204	14.66	2376.6
3462	1213	15.46	2375.1
3704	1225	16.67	2368.5
3940	1233	17.85	2353.0
4080	1201	18.55	2261.8



Signet Testing Labs

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - TXUU

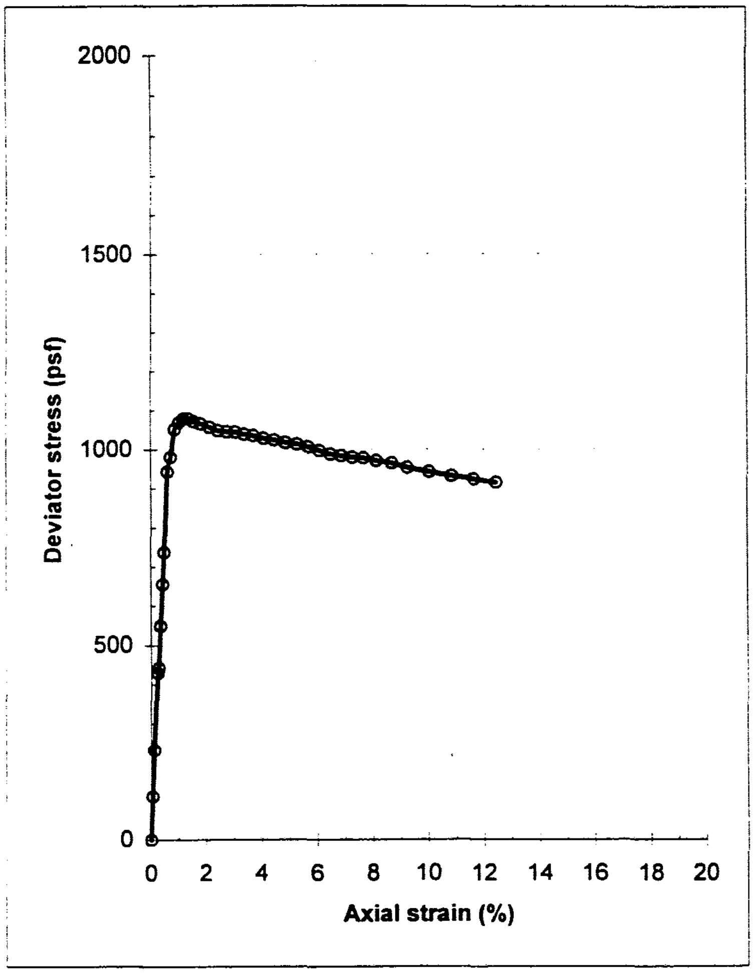
Client : –
Project : Thompson Creek
Job # : –
Boring # : DH - 4
Sample # : S-3
Depth (ft) : 19 - 21
Date tested : 12/20/98
Soil : (CL) Brown silty clay w/ occ. f. gravel

Specimen:
Total wt. = 1291.1 gms
Ht. = 6.00 in
Ave dia. = 2.877 in
Area = 6.503 sq.in
Volume = 639.4 c.c.
Moisture = 22.4 %
Total density = 126.0 pcf
Dry density = 103.0 pcf

Dial factor = 0.000300 in/unit
Load factor = 0.123859 lb/unit
Shearing rate = 0.05 in/min
SigC = 2160 psf

Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
430	196	0.00	0.0
441	237	0.05	112.4
456	281	0.13	232.8
480	353	0.25	429.5
487	358	0.28	443.0
501	397	0.35	549.3
517	436	0.43	655.3
530	466	0.50	736.8
553	542	0.61	943.1
576	556	0.73	980.1
607	583	0.88	1052.0
638	590	1.04	1069.3
669	594	1.19	1078.5
707	595	1.38	1079.1
747	593	1.58	1071.5
795	592	1.82	1066.2
862	590	2.16	1057.2
920	588	2.45	1048.7
983	588	2.76	1045.4
1045	589	3.07	1044.7
1108	588	3.39	1038.6
1173	588	3.71	1035.2
1251	587	4.10	1028.3
1329	587	4.49	1024.2
1407	586	4.88	1017.4
1489	586	5.29	1013.0
1568	585	5.68	1006.2
1648	583	6.08	996.8
1727	581	6.48	987.5
1805	581	6.87	983.3
1884	581	7.26	979.2
1964	582	7.66	977.5
2058	581	8.13	970.0
2169	581	8.69	964.1
2281	579	9.25	953.3
2440	578	10.04	942.5
2600	577	10.84	931.6
2760	577	11.64	923.3
2921	577	12.44	914.9

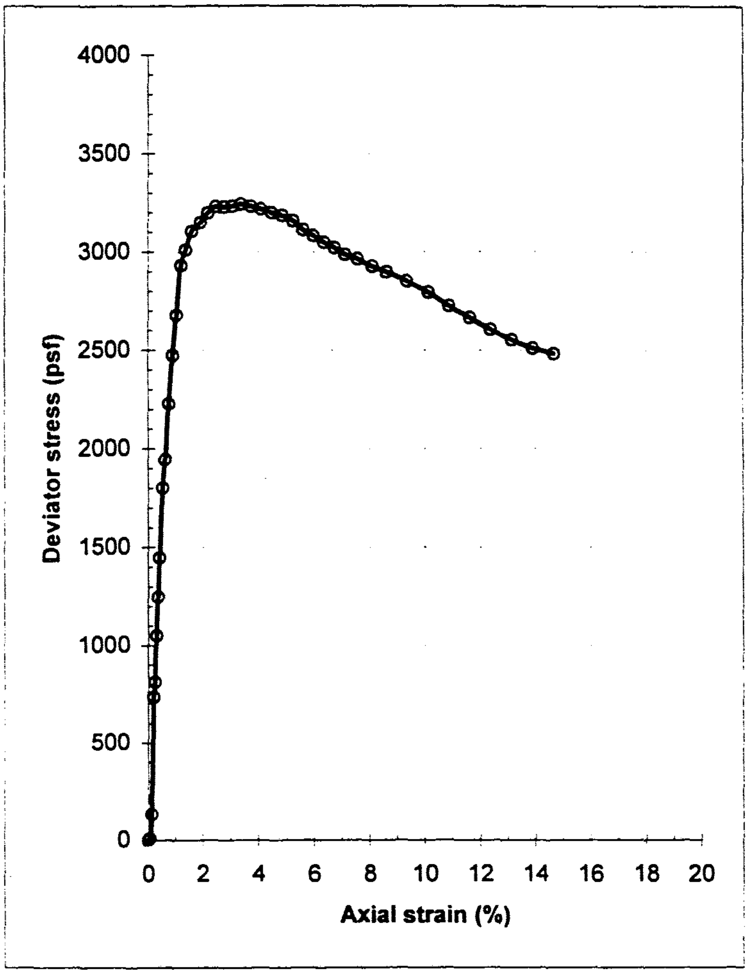


UNCONSOLIDATED UNDRAINED COMPRESSION TEST - TXUU

Client : –
Project : Thompson Creek
Job # : –
Boring # : DH-6
Sample # : S-1
Depth (ft) : 10-12
Date tested : 12/5/98
Soil : (CL) Dk brown silty clay w/ tr. F. gravel

Specimen:
Total wt. = 1167.8 gms
Ht. = 6.00 in
Ave dia. = 2.861 in
Area = 6.431 sq.in
Volume = 632.3 c.c.
Moisture = 16.5 %
Total density = 115.2 pcf
Dry density = 98.9 pcf

Dial factor = 0.000300 in/unit
Load factor = 0.123859 lb/unit
Shearing rate = 0.05 in/min
SigC = 1440 psf



Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
100	189	0.00	0.0
113	193	0.06	11.1
125	237	0.12	132.9
143	455	0.21	736.1
149	483	0.24	813.3
161	569	0.30	1050.6
173	641	0.36	1248.9
186	713	0.43	1446.9
206	842	0.53	1801.3
225	895	0.62	1945.7
252	999	0.76	2229.3
279	1089	0.89	2473.6
307	1165	1.03	2678.7
341	1259	1.20	2931.7
377	1290	1.38	3011.1
421	1327	1.60	3105.4
483	1347	1.91	3150.0
537	1368	2.18	3198.3
596	1384	2.48	3231.9
655	1387	2.77	3230.3
714	1392	3.07	3233.9
774	1400	3.37	3245.3
848	1400	3.74	3232.9
921	1399	4.10	3218.0
995	1397	4.47	3200.3
1071	1396	4.85	3185.0
1147	1391	5.23	3159.1
1222	1378	5.60	3112.6
1298	1371	5.98	3081.8
1373	1363	6.36	3048.8
1448	1357	6.73	3021.1
1524	1348	7.11	2985.6
1613	1345	7.56	2963.6
1719	1337	8.09	2926.2
1824	1332	8.61	2896.9
1975	1323	9.37	2850.3
2127	1310	10.12	2794.1
2277	1292	10.87	2726.3
2427	1277	11.62	2666.6
2578	1261	12.38	2604.9
2731	1249	13.14	2553.3
2885	1241	13.91	2511.6
3038	1239	14.68	2484.6

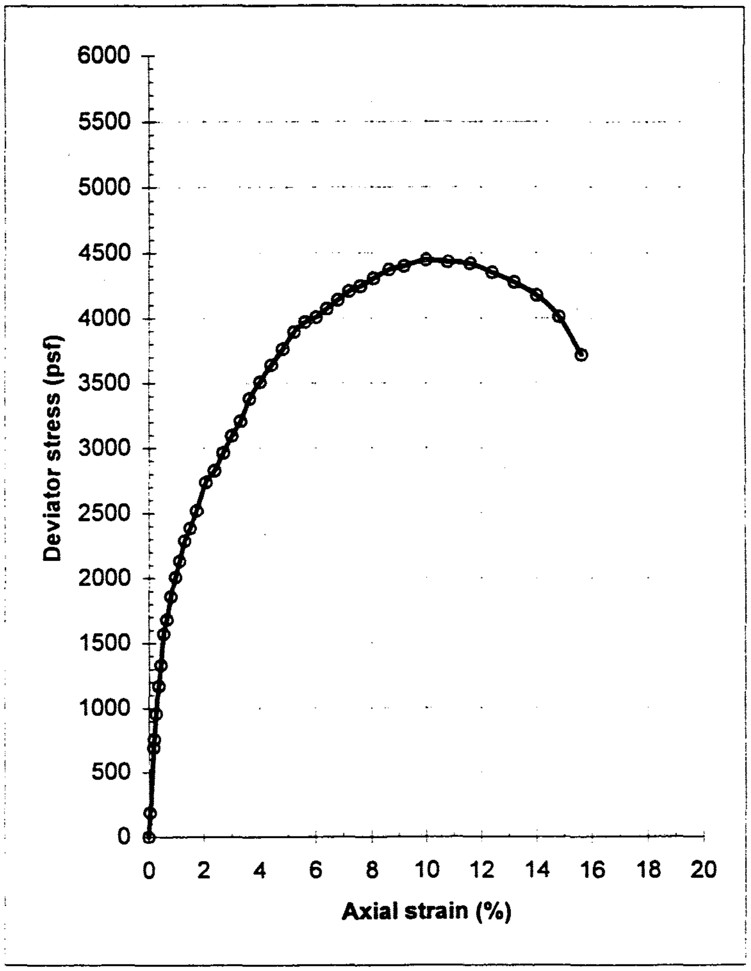
UNCONSOLIDATED UNDRAINED COMPRESSION TEST - TXUU

Client : --
Project : Thompson Creek
Job # : --
Boring # : DH - 7
Sample # : L 2b
Depth (ft) : 19 - 19.5
Date tested : 12/20/98
Soil : (CL) Brown silty clay w/ occ. f. gravel

Specimen:

Total wt. = 935.7 gms
Ht. = 5.97 in
Ave dia. = 2.399 in
Area = 4.522 sq.in
Volume = 442.4 c.c.
Moisture = 14.2 %
Total density = 132.0 pcf
Dry density = 115.6 pcf

Dial factor = 0.000300 in/unit
Load factor = 0.123859 lb/unit
Shearing rate = 0.05 in/min
SigC = 2160 psf



Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
480	210	0.00	0.0
491	258	0.06	189.2
515	386	0.18	693.0
521	403	0.21	759.7
535	453	0.28	955.8
550	508	0.35	1171.3
566	549	0.43	1331.3
589	611	0.55	1573.0
611	639	0.66	1681.0
641	685	0.81	1858.4
672	724	0.96	2007.8
704	757	1.12	2133.2
741	798	1.31	2288.8
781	824	1.51	2385.2
827	860	1.74	2519.1
895	919	2.08	2738.2
952	944	2.37	2826.5
1014	982	2.68	2963.3
1077	1019	3.00	3095.3
1139	1051	3.31	3207.4
1204	1100	3.63	3382.8
1283	1137	4.03	3508.9
1361	1175	4.42	3637.9
1439	1212	4.81	3761.9
1520	1251	5.22	3891.6
1599	1276	5.62	3968.4
1679	1291	6.02	4007.1
1757	1313	6.41	4071.6
1836	1336	6.81	4138.9
1915	1359	7.20	4205.5
1995	1375	7.61	4245.6
2090	1397	8.08	4303.4
2201	1423	8.64	4371.0
2312	1438	9.20	4398.1
2471	1462	10.00	4444.6
2630	1469	10.79	4429.8
2791	1477	11.60	4417.6
2953	1469	12.41	4349.3
3113	1459	13.22	4275.2
3274	1441	14.03	4174.4
3435	1404	14.83	4010.8
3597	1328	15.65	3719.7

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - TXUU

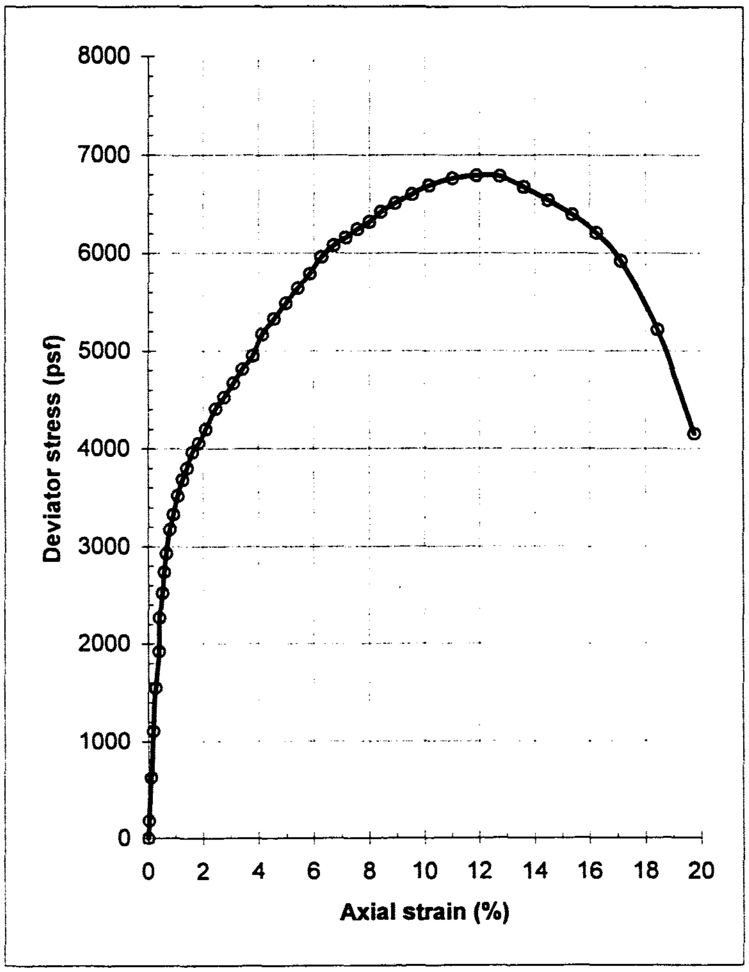
Client : --
Project : Thompson Creek
Job # : --
Boring # : DH - 10
Sample # : L 1a
Depth (ft) : 2.5 - 3
Date tested : 1/6/99
Soil : (CH/CL) Dark brown clay w/ occ f. gravel

Specimen:
Total wt. = 789.0 gms
Ht. = 4.96 in
Ave dia. = 2.412 in
Area = 4.571 sq.in
Volume = 371.5 c.c.
Moisture = 16.9 %
Total density = 132.5 pcf
Dry density = 113.3 pcf

Dial factor = 0.000300 in/unit
Load factor = 0.123859 lb/unit
Shearing rate = 0.044 in/min
SigC = 720 psf

Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
332	183	0.00	0.0
337	230	0.03	183.3
351	343	0.11	623.6
363	467	0.19	1106.0
376	581	0.27	1548.8
398	677	0.40	1919.8
403	767	0.43	2268.9
417	833	0.51	2523.2
429	889	0.59	2738.6
444	939	0.68	2929.8
465	1004	0.80	3177.7
484	1044	0.92	3328.6
512	1095	1.09	3519.8
540	1139	1.26	3683.3
567	1171	1.42	3800.3
601	1216	1.63	3965.1
637	1242	1.84	4055.9
679	1282	2.10	4198.2
739	1341	2.46	4407.2
790	1375	2.77	4522.3
847	1418	3.11	4668.8
902	1461	3.44	4814.8
959	1501	3.79	4947.8
1016	1564	4.13	5165.8
1087	1614	4.56	5328.8
1157	1663	4.98	5486.9
1228	1712	5.41	5642.9
1299	1759	5.84	5790.0
1370	1813	6.27	5961.1
1442	1853	6.71	6079.1
1513	1883	7.14	6159.8
1584	1914	7.57	6243.2
1655	1943	7.99	6318.3
1726	1980	8.42	6421.0
1811	2015	8.94	6509.4
1911	2052	9.54	6596.8
2012	2091	10.15	6689.0
2155	2130	11.02	6760.1
2298	2158	11.88	6790.7
2440	2175	12.74	6782.5
2584	2163	13.61	6674.4
2728	2143	14.48	6540.4
2875	2119	15.37	6393.3
3020	2083	16.24	6209.4
3165	2014	17.12	5921.3
3382	1822	18.43	5216.6
3602	1509	19.76	4151.6

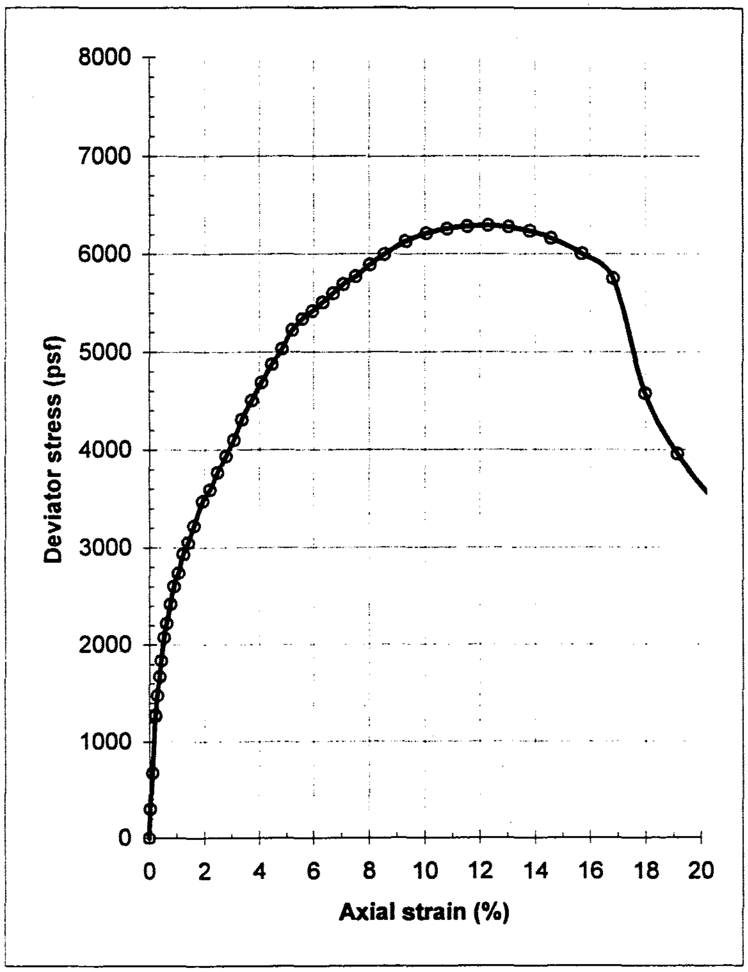


UNCONSOLIDATED UNDRAINED COMPRESSION TEST - TXUU

Client : –
Project : Thompson Creek
Job # : –
Boring # : DH - 10
Sample # : L 3a
Depth (ft) : 15.5 - 16
Date tested : 1/6/99
Soil : (CH/CL) Dark brown clay

Specimen:
Total wt. = 860.4 gms
Ht. = 5.73 in
Ave dia. = 2.399 in
Area = 4.522 sq.in
Volume = 424.6 c.c.
Moisture = 21.9 %
Total density = 126.4 pcf
Dry density = 103.8 pcf

Dial factor = 0.000300 in/unit
Load factor = 0.123859 lb/unit
Shearing rate = 0.044 in/min
SigC = 2160 psf



Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
130	193	0.00	0.0
140	269	0.05	299.6
152	364	0.12	673.7
172	517	0.22	1275.1
176	515	0.24	1267.0
189	569	0.31	1478.5
201	619	0.37	1674.0
214	661	0.44	1837.8
234	722	0.54	2075.2
252	760	0.64	2222.1
278	811	0.77	2418.7
304	859	0.91	2603.0
331	894	1.05	2735.9
364	946	1.22	2933.7
398	977	1.40	3048.9
439	1023	1.62	3220.8
500	1090	1.94	3469.5
550	1124	2.20	3591.4
605	1173	2.48	3769.3
661	1219	2.78	3934.4
717	1265	3.07	4098.4
775	1323	3.37	4306.6
844	1379	3.73	4503.2
912	1432	4.09	4687.0
983	1486	4.46	4872.4
1052	1533	4.82	5030.4
1124	1590	5.20	5223.6
1196	1626	5.58	5337.0
1268	1653	5.95	5415.8
1339	1683	6.32	5505.3
1411	1714	6.70	5597.3
1482	1745	7.07	5688.6
1567	1774	7.52	5767.2
1666	1816	8.03	5887.2
1765	1855	8.55	5994.8
1908	1905	9.30	6124.6
2052	1943	10.05	6208.6
2195	1971	10.80	6255.4
2338	1993	11.55	6279.7
2480	2011	12.29	6289.3
2623	2022	13.04	6273.4
2769	2027	13.80	6235.3
2915	2022	14.57	6163.2
3132	1999	15.70	6004.8
3348	1945	16.83	5747.2
3568	1607	17.98	4574.3
3787	1433	19.13	3955.4
4063	1294	20.57	3449.3

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - TXUU

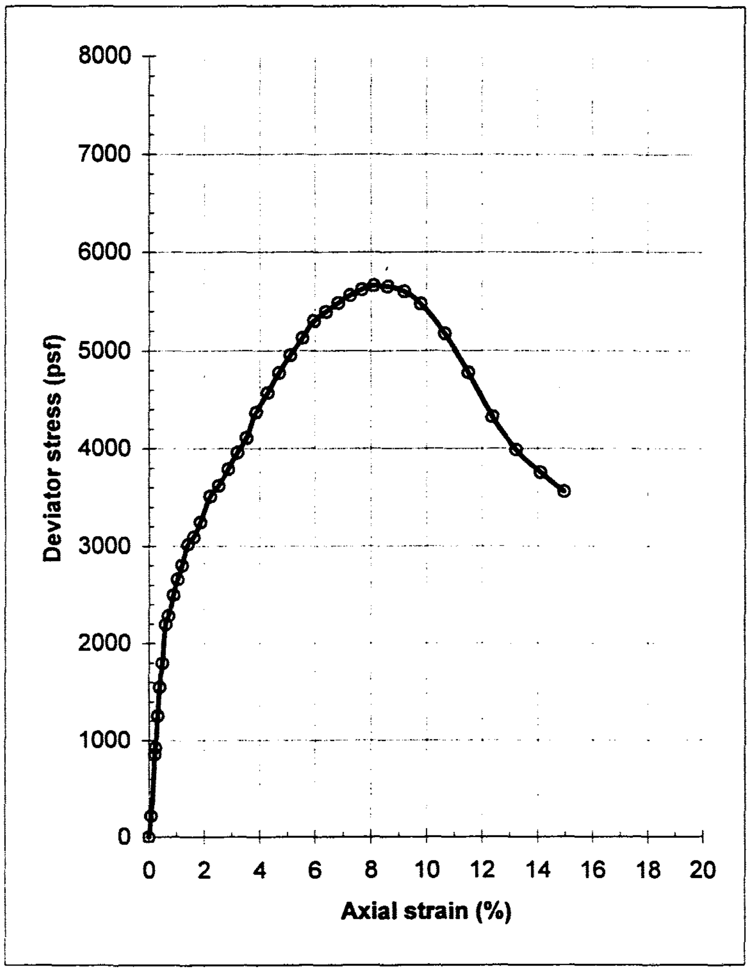
Client : –
Project : Thompson Creek
Job # : –
Boring # : DH - 12
Sample # : L 1a
Depth (ft) : 2.5 - 3
Date tested : 1/6/99
Soil : (CL) Brown sandy clay w/ some f. gravel

Specimen:
Total wt. = 811.6 gms
Ht. = 5.02 in
Ave dia. = 2.417 in
Area = 4.590 sq.in
Volume = 377.6 c.c.
Moisture = 10.7 %
Total density = 134.1 pcf
Dry density = 121.2 pcf

Dial factor = 0.000300 in/unit
Load factor = 0.123859 lb/unit
Shearing rate = 0.044 in/min
SigC = 720 psf

Data Reduction:

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
332	171	0.00	0.0
347	227	0.09	217.4
369	391	0.22	853.0
373	409	0.24	922.5
386	495	0.32	1254.9
399	572	0.40	1551.9
413	636	0.48	1798.1
434	739	0.61	2193.7
452	763	0.72	2283.9
479	820	0.88	2499.7
506	863	1.04	2661.0
533	901	1.20	2802.5
568	959	1.41	3018.8
603	980	1.62	3092.7
644	1022	1.86	3245.2
705	1095	2.23	3510.5
756	1127	2.53	3620.7
811	1175	2.86	3789.7
868	1223	3.20	3957.0
923	1267	3.53	4108.5
981	1341	3.87	4370.1
1050	1399	4.29	4567.1
1119	1460	4.70	4773.4
1189	1514	5.12	4951.5
1259	1568	5.53	5127.9
1330	1621	5.96	5298.6
1402	1653	6.39	5390.8
1474	1685	6.82	5481.9
1545	1714	7.24	5561.5
1617	1737	7.67	5618.2
1687	1756	8.09	5660.6
1773	1762	8.60	5650.3
1872	1758	9.19	5599.7
1972	1733	9.79	5475.2
2115	1661	10.64	5173.4
2260	1560	11.51	4776.0
2405	1441	12.38	4324.1
2549	1354	13.24	3988.4
2693	1296	14.10	3755.3
2839	1249	14.97	3561.9

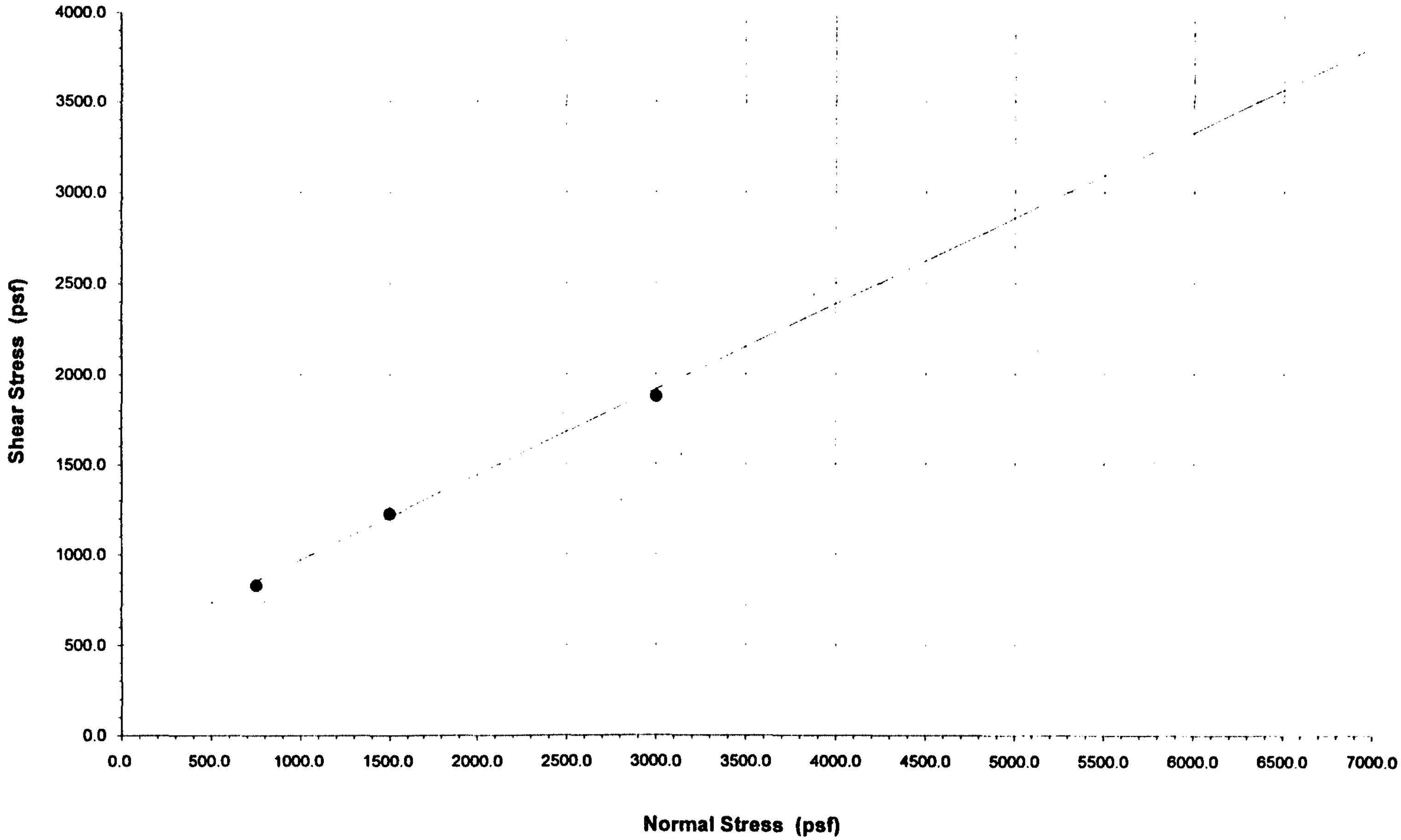


CONSOLIDATED DRAINED DIRECT SHEAR TESTS

CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

PROJECT : Thompson Creek
JOB NO. : --
SAMPLE ID : DH-2 S-1 @ 5.6-7 ft.
SOIL : (CH/CL) Dk brown fat clay w/ tr. Gravel

Normal Pressure (psf)	Shear Stress (psf)	Dry Density (pcf)	Initial moisture (%)
750	826.2	108.7	18.1
1500	1225.1	107.5	18.8
3000	1875.4	108.9	17.6



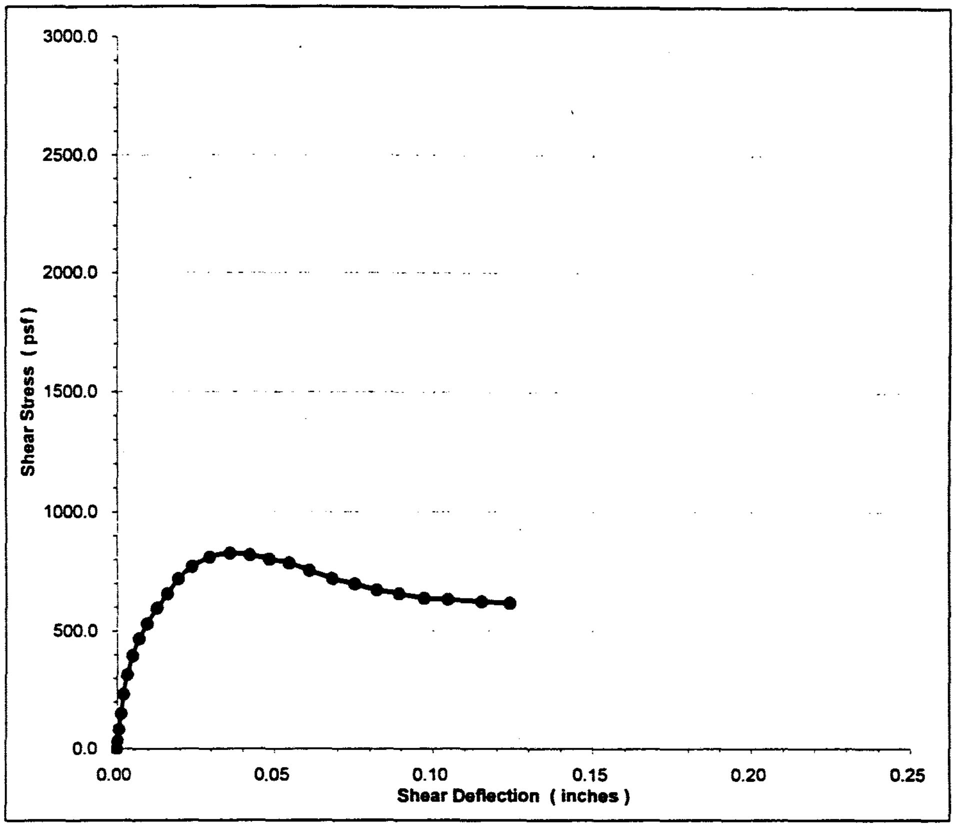
CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

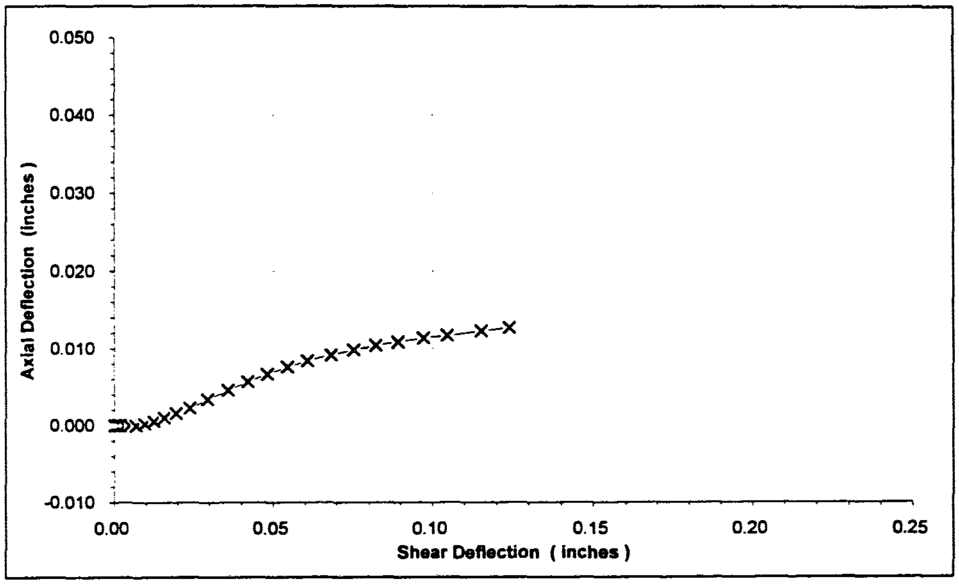
PROJECT : Thompson Creek
JOB NO. : –
SAMPLE ID : DH-2 S-1 @ 5.6-7 ft.
SOIL : (CH/CL) Dk brown fat clay w/ tr. Gravel

	Initial	Final	As Rec'd
wet density (pcf) =	128.4		
dry density (pcf) =	108.7	108.0	
moisture (%) =	18.1	21.0	

SigN = 750 psf
Load cell = 1.0 lbs / %
Shearing rate = 0.025 in./ hr.

SHEAR DEFL. (in.)	AXIAL DEFL. (in.)	SHEAR STRESS (Psf)
0.0000	0.0000	0.0
0.0002	0.0000	34.6
0.0006	0.0000	81.7
0.0013	0.0000	150.8
0.0022	0.0000	232.5
0.0033	0.0000	314.1
0.0050	0.0000	395.8
0.0070	0.0000	468.1
0.0096	0.0002	530.9
0.0125	0.0006	596.9
0.0158	0.0010	656.5
0.0193	0.0016	719.4
0.0237	0.0024	769.6
0.0294	0.0034	810.5
0.0358	0.0046	826.2
0.0421	0.0057	819.9
0.0483	0.0067	801.0
0.0546	0.0076	785.3
0.0608	0.0084	753.9
0.0681	0.0092	719.4
0.0752	0.0098	697.4
0.0821	0.0104	672.3
0.0892	0.0109	656.5
0.0971	0.0114	637.7
0.1046	0.0117	631.4
0.1152	0.0123	622.0
0.1240	0.0127	615.7



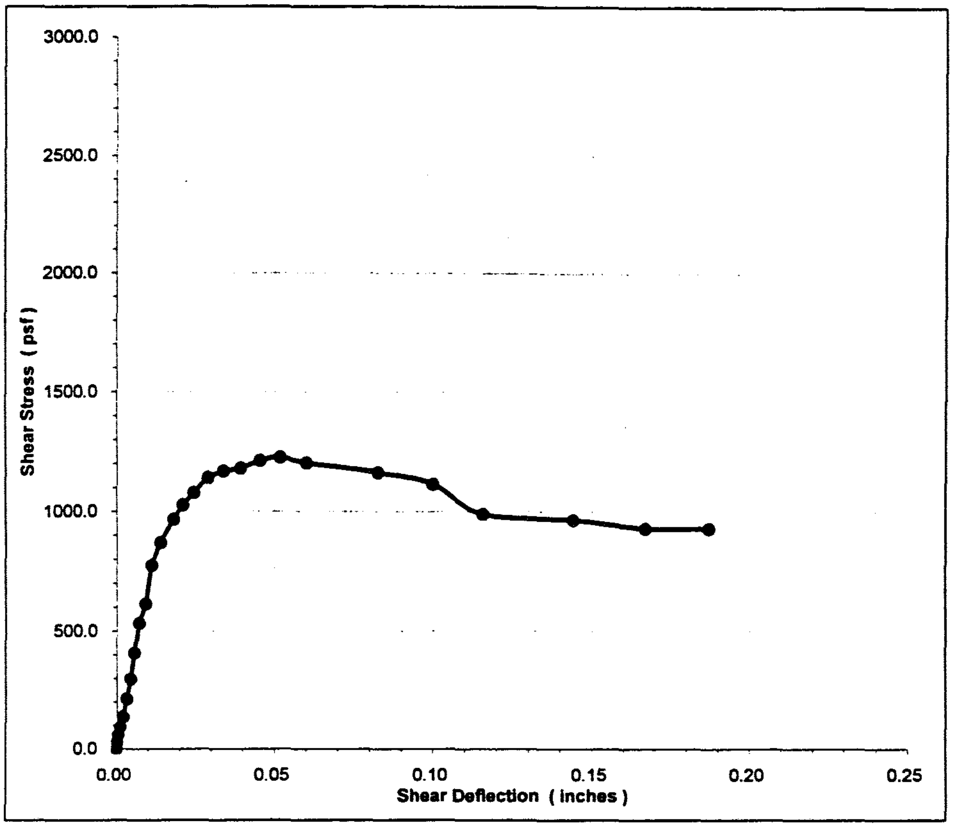


CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

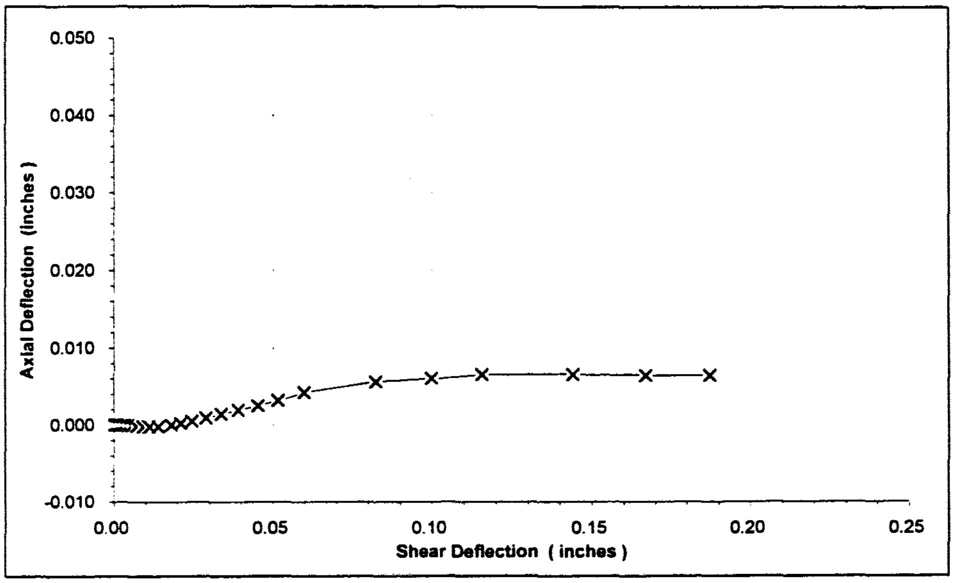
PROJECT : Thompson Creek
JOB NO. : –
SAMPLE ID : DH-2 S-1 @ 5.6-7 ft.
SOIL : (CH/CL) Dk brown fat clay w/ tr. Gravel

	Initial	Final	As Rec'd
wet density (pcf) =	127.7		
dry density (pcf) =	107.5	107.8	
moisture (%) =	18.8	21.5	

SigN =	1500	psf
Load cell =	1.0	lbs / %
Shearing rate =	0.025	in./ hr.



SHEAR DEFL. (in.)	AXIAL DEFL. (in.)	SHEAR STRESS (Psf)
0.0000	0.0000	0.0
0.0002	0.0000	28.3
0.0006	0.0000	59.7
0.0013	0.0000	94.2
0.0021	0.0000	138.2
0.0032	0.0000	213.6
0.0044	-0.0001	298.4
0.0056	-0.0002	408.4
0.0071	-0.0002	534.0
0.0092	-0.0002	615.7
0.0113	-0.0002	775.9
0.0139	-0.0002	870.2
0.0181	0.0000	967.5
0.0210	0.0002	1027.2
0.0246	0.0005	1077.5
0.0290	0.0009	1140.3
0.0338	0.0014	1168.6
0.0392	0.0019	1181.2
0.0454	0.0025	1212.6
0.0517	0.0032	1225.1
0.0600	0.0042	1203.1
0.0825	0.0056	1162.3
0.1000	0.0060	1115.2
0.1158	0.0065	989.5
0.1442	0.0065	964.4
0.1670	0.0064	929.8
0.1871	0.0064	929.8

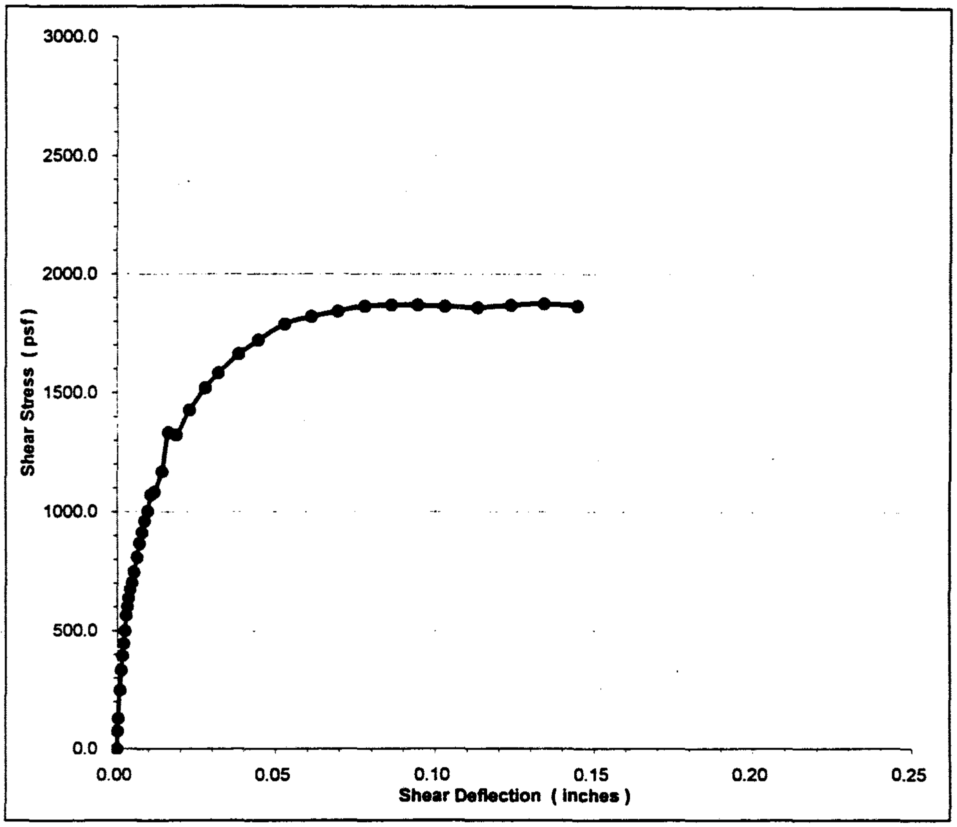


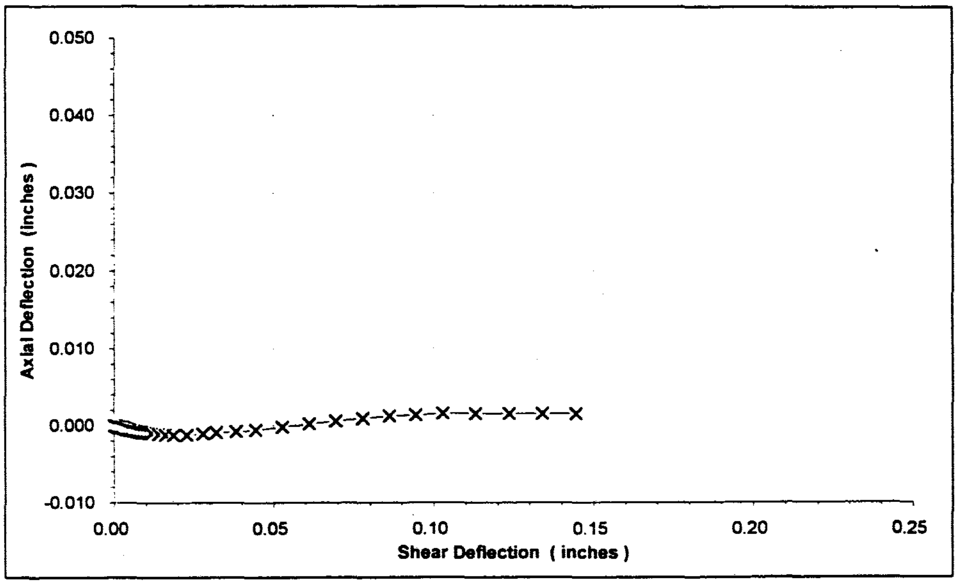
CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

PROJECT : Thompson Creek
JOB NO. : –
SAMPLE ID : DH-2 S-1 @ 5.6-7 ft.
SOIL : (CH/CL) Dk brown fat clay w/ tr. Gravel

	Initial	Final	As Rec'd
wet density (pcf) =	128.1		
dry density (pcf) =	108.9	111.4	
moisture (%) =	17.6	21.0	

SigN =	3000	psf
Load cell =	1.0	lbs / %
Shearing rate =	0.025	in./ hr.



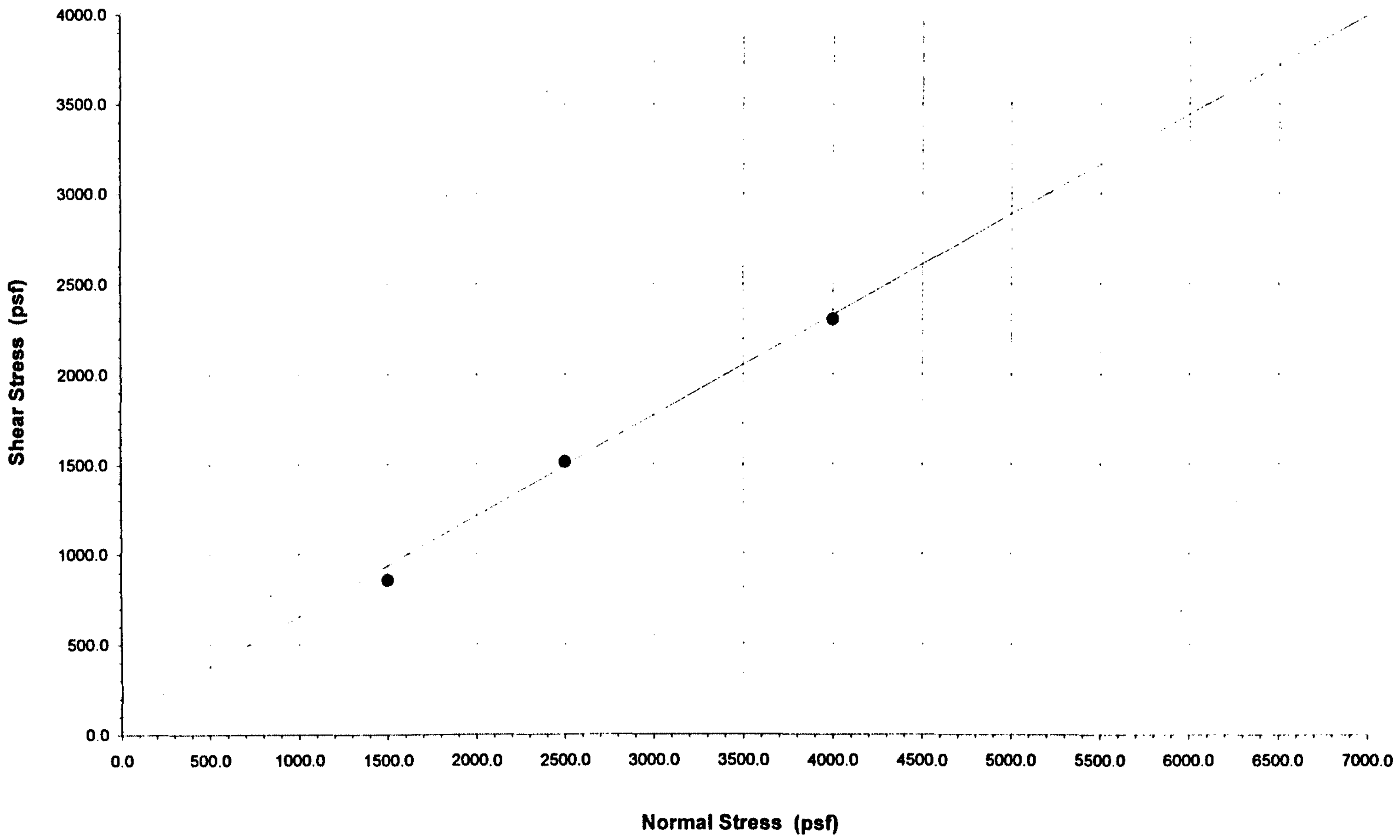


SHEAR DEFL. (in.)	AXIAL DEFL. (in.)	SHEAR STRESS (Psf)
0.0000	0.0000	0.0
0.0002	0.0000	75.4
0.0004	-0.0001	128.8
0.0008	-0.0001	248.2
0.0013	-0.0002	333.0
0.0017	-0.0002	395.8
0.0021	-0.0002	446.1
0.0025	-0.0003	499.5
0.0029	-0.0003	565.4
0.0033	-0.0004	600.0
0.0038	-0.0005	637.7
0.0042	-0.0005	675.4
0.0046	-0.0006	703.7
0.0052	-0.0007	747.6
0.0063	-0.0007	810.5
0.0071	-0.0008	867.0
0.0079	-0.0009	914.1
0.0088	-0.0010	961.3
0.0098	-0.0010	1002.1
0.0108	-0.0011	1071.2
0.0119	-0.0011	1083.8
0.0142	-0.0012	1168.6
0.0163	-0.0012	1331.9
0.0188	-0.0013	1322.5
0.0229	-0.0013	1426.2
0.0279	-0.0011	1520.4
0.0321	-0.0009	1583.2
0.0383	-0.0008	1661.8
0.0446	-0.0006	1721.5
0.0529	-0.0002	1787.4
0.0613	0.0002	1818.8
0.0696	0.0006	1840.8
0.0779	0.0009	1862.8
0.0863	0.0012	1869.1
0.0946	0.0014	1869.1
0.1029	0.0016	1862.8
0.1133	0.0015	1859.7
0.1238	0.0015	1869.1
0.1342	0.0015	1875.4
0.1446	0.0015	1866.0
0.1550	0.0015	1859.7

CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

PROJECT : Thompson Creek
JOB NO. : --
SAMPLE ID : DH-3 S-1 @ 10 - 12 ft.
SOIL : (CH/CL) Dk brown clay w/ occ. f. gravel

Normal Pressure (psf)	Shear Stress (psf)	Dry Density (pcf)	Initial moisture (%)
1500	857.6	85.7	25.0
2500	1514.1	93.7	25.1
4000	2302.6	100.2	23.7



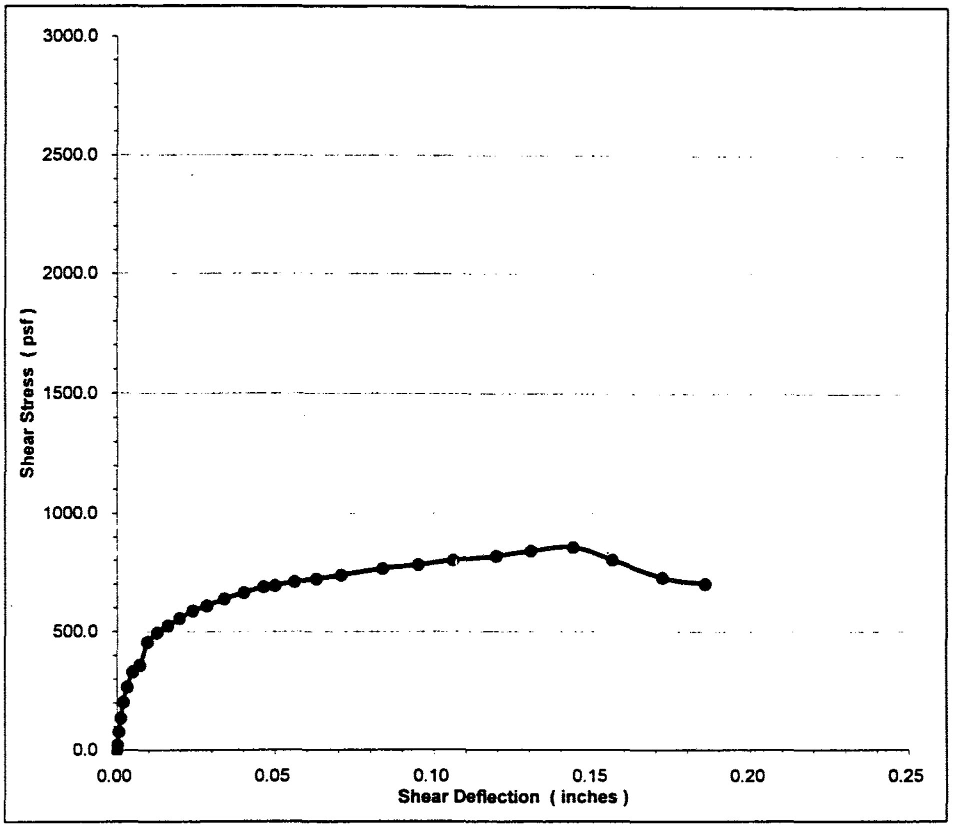
CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

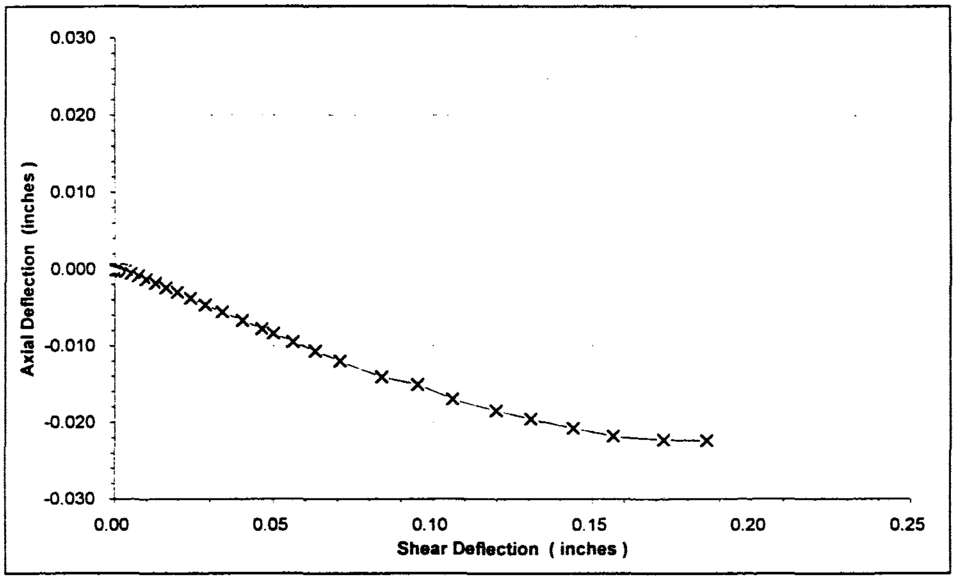
PROJECT : Thompson Creek
JOB NO. : –
SAMPLE ID : DH-3 S-1 @ 10 - 12 ft.
SOIL : (CH/CL) Dk brown clay w/ occ. f. gravel

	Initial	Final	As Rec'd
wet density (pcf) =	107.2		
dry density (pcf) =	85.7	89.3	
moisture (%) =	25.0	29.8	

SigN = 1500 psf

Load cell = 1.0 lbs / %
Shearing rate = 0.025 in./ hr.





SHEAR DEFL. (in.)	AXIAL DEFL. (in.)	SHEAR STRESS (Psf)
0.0000	0.0000	0.0
0.0002	0.0000	22.0
0.0006	0.0000	78.5
0.0012	0.0000	135.1
0.0020	-0.0001	204.2
0.0033	-0.0003	267.0
0.0050	-0.0005	329.8
0.0073	-0.0008	358.1
0.0098	-0.0013	455.5
0.0127	-0.0018	493.2
0.0160	-0.0024	524.6
0.0198	-0.0030	556.0
0.0239	-0.0038	587.4
0.0285	-0.0047	609.4
0.0339	-0.0056	637.7
0.0402	-0.0067	662.8
0.0464	-0.0078	688.0
0.0500	-0.0084	694.2
0.0561	-0.0095	709.9
0.0630	-0.0108	722.5
0.0709	-0.0121	738.2
0.0839	-0.0141	766.5
0.0952	-0.0151	782.2
0.1060	-0.0170	801.0
0.1198	-0.0185	819.9
0.1306	-0.0196	841.9
0.1439	-0.0208	857.6
0.1564	-0.0218	804.2
0.1723	-0.0223	728.8
0.1858	-0.0224	703.7

Signet Testing Labs

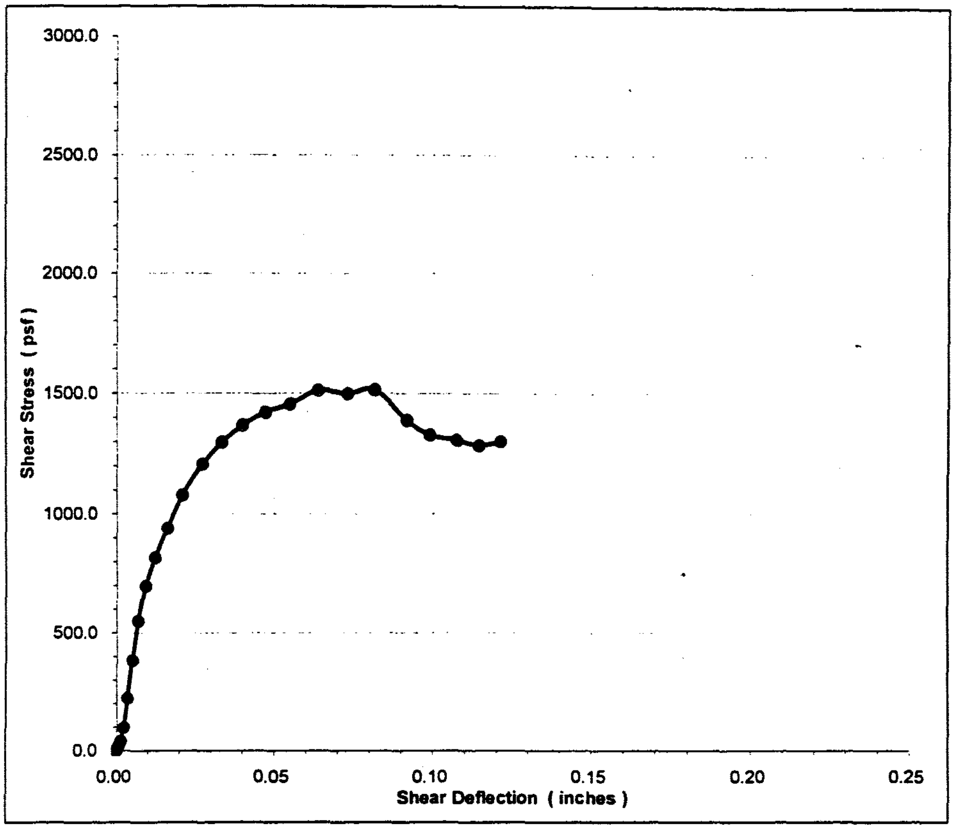
CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

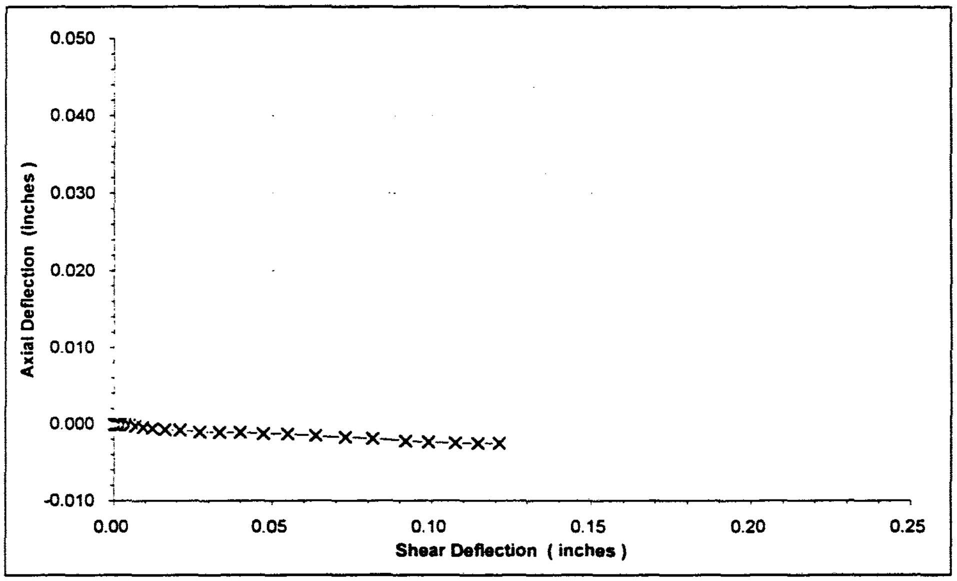
PROJECT : Thompson Creek
JOB NO. : –
SAMPLE ID : DH-3 S-1 @ 10 - 12 ft.
SOIL : (CH/CL) Dk brown clay w/ occ. f. gravel

	Initial	Final	As Rec'd
wet density (pcf) =	117.3		
dry density (pcf) =	93.7	95.6	
moisture (%) =	25.1	27.5	

SigN = 2500 psf

Load cell = 1.0 lbs / %
Shearing rate = 0.025 in./ hr.





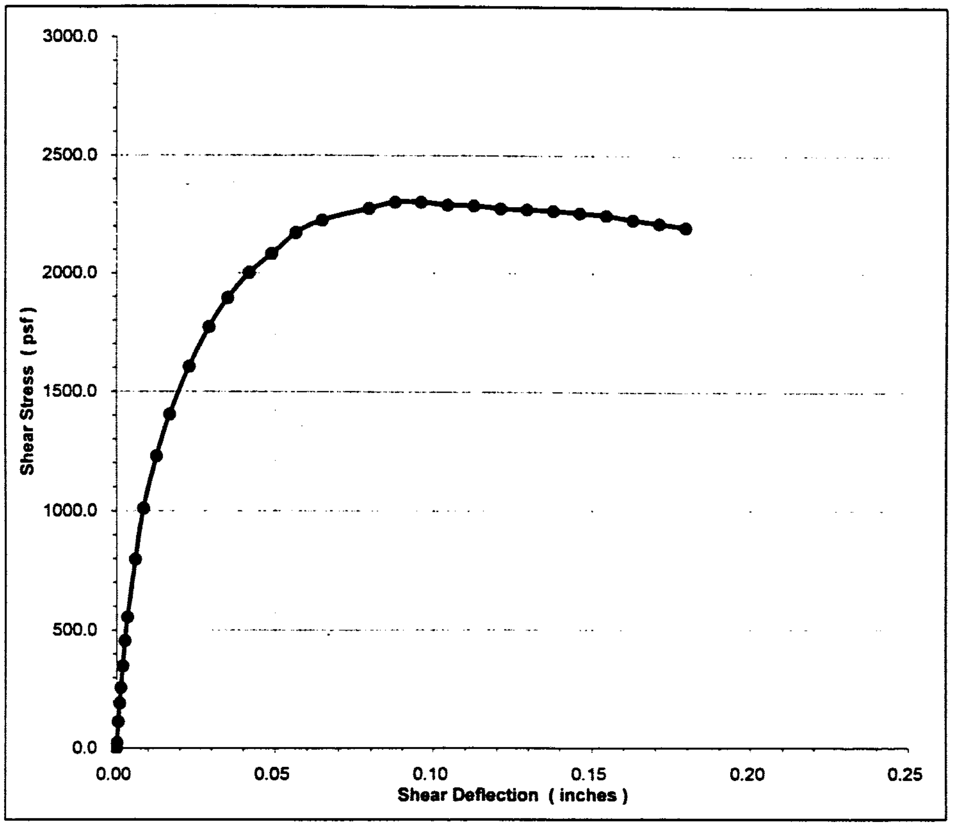
SHEAR DEFL. (in.)	AXIAL DEFL. (in.)	SHEAR STRESS (Psf)
0.0000	0.0000	0.0
0.0002	0.0000	6.3
0.0004	0.0000	9.4
0.0008	-0.0001	25.1
0.0015	-0.0001	40.8
0.0023	-0.0001	97.4
0.0035	-0.0001	223.0
0.0050	-0.0002	383.2
0.0068	-0.0003	549.7
0.0093	-0.0005	697.4
0.0123	-0.0006	816.8
0.0163	-0.0008	939.3
0.0210	-0.0009	1077.5
0.0273	-0.0011	1206.3
0.0335	-0.0012	1297.4
0.0400	-0.0012	1366.5
0.0474	-0.0013	1419.9
0.0549	-0.0014	1454.5
0.0637	-0.0016	1511.0
0.0729	-0.0018	1498.4
0.0815	-0.0020	1514.1
0.0918	-0.0023	1388.5
0.0990	-0.0024	1328.8
0.1075	-0.0025	1306.8
0.1144	-0.0026	1284.8
0.1211	-0.0026	1300.5

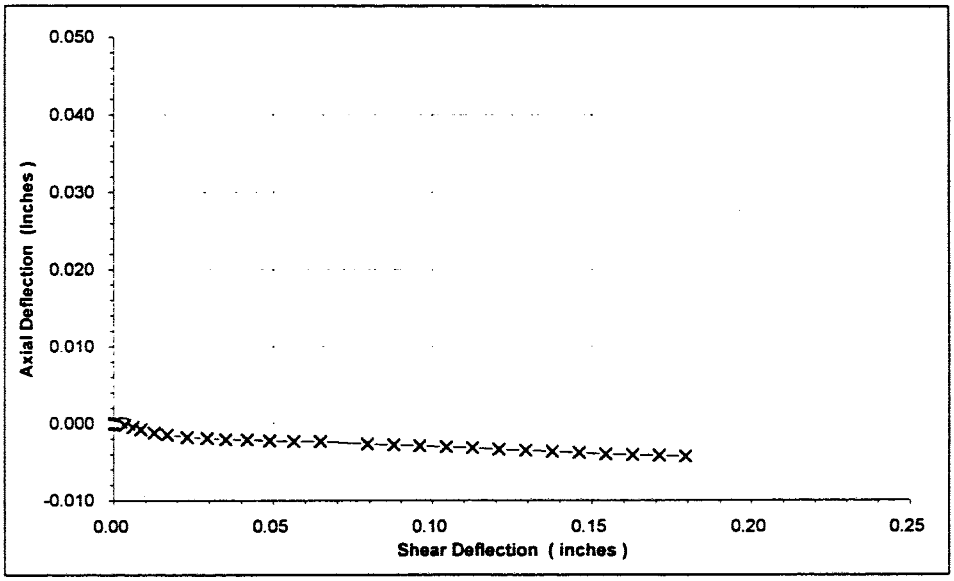
CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

PROJECT : Thompson Creek
JOB NO. : –
SAMPLE ID : DH-3 S-1 @ 10 - 12 ft.
SOIL : (CH/CL) Dk brown clay w/ occ. f. gravel

	Initial	Final	As Rec'd
wet density (pcf) =	123.9		
dry density (pcf) =	100.2	103.1	
moisture (%) =	23.7	25.1	

SigN =	4000	psf
Load cell =	1.0	lbs / %
Shearing rate =	0.025	in./ hr.



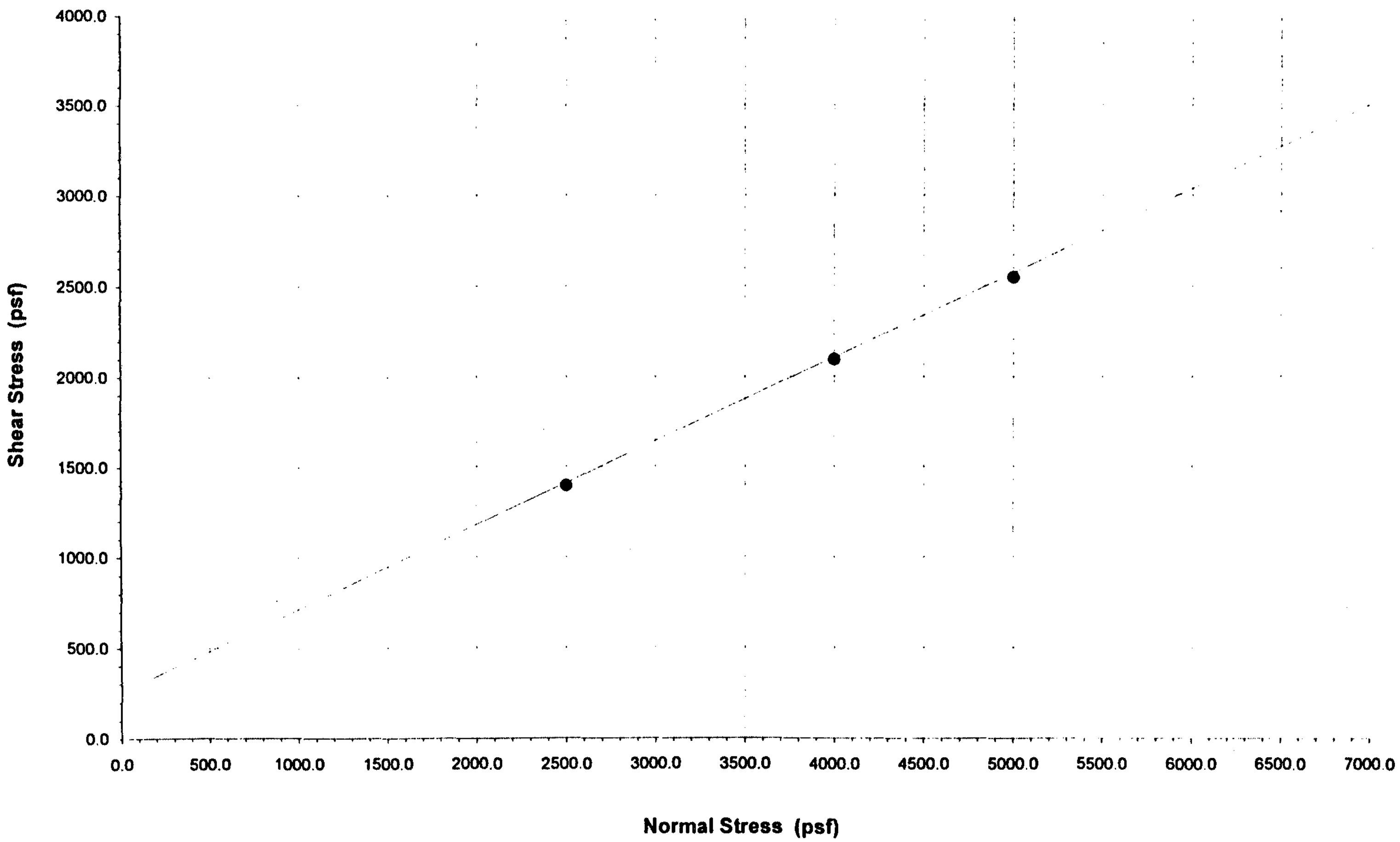


SHEAR DEFL. (in.)	AXIAL DEFL. (in.)	SHEAR STRESS (Psf)
0.0000	0.0000	0.0
0.0002	0.0000	25.1
0.0006	0.0000	113.1
0.0010	-0.0001	191.6
0.0014	-0.0001	257.6
0.0020	-0.0001	348.7
0.0027	-0.0001	455.5
0.0035	-0.0002	556.0
0.0060	-0.0005	797.9
0.0085	-0.0008	1011.5
0.0127	-0.0012	1228.3
0.0168	-0.0015	1404.2
0.0231	-0.0018	1605.2
0.0293	-0.0020	1771.7
0.0352	-0.0021	1894.2
0.0418	-0.0022	2001.0
0.0489	-0.0023	2082.7
0.0564	-0.0024	2170.7
0.0648	-0.0024	2224.1
0.0793	-0.0027	2274.3
0.0877	-0.0028	2302.6
0.0960	-0.0030	2302.6
0.1043	-0.0031	2290.1
0.1127	-0.0032	2286.9
0.1210	-0.0034	2274.3
0.1293	-0.0035	2271.2
0.1377	-0.0037	2264.9
0.1460	-0.0038	2255.5
0.1543	-0.0040	2246.1
0.1627	-0.0041	2227.2
0.1710	-0.0042	2211.5
0.1793	-0.0043	2195.8

CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

PROJECT : Thompson Creek
JOB NO. : --
SAMPLE ID : DH-5 S-2 @ 23.5 - 25 ft.
SOIL : (CL) Yellowish brown clay w/ occ. f. gravel

Normal Pressure (psf)	Shear Stress (psf)	Dry Density (pcf)	Initial moisture (%)
2500	1394.8	96.4	26.1
4000	2095.3	101.9	22.5
5000	2547.6	98.5	25.3



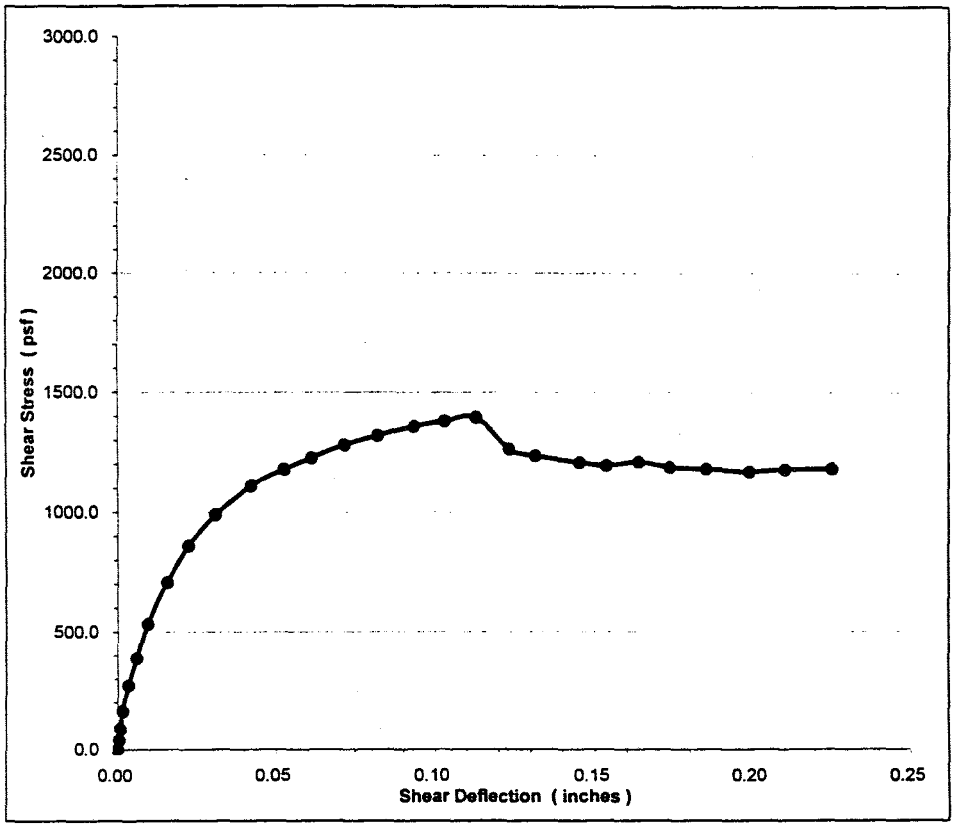
CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

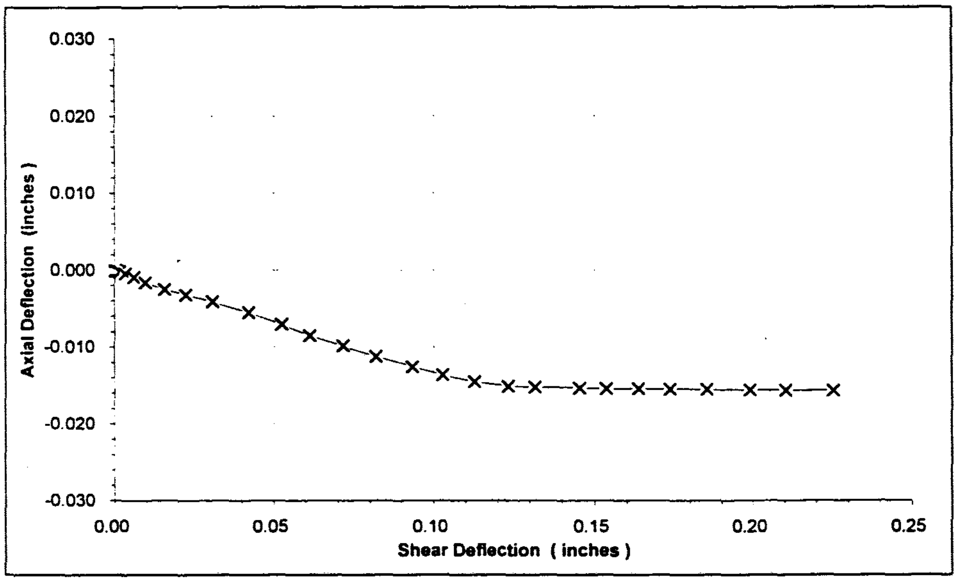
PROJECT : Thompson Creek
JOB NO. : –
SAMPLE ID : DH-5 S-2 @ 23.5 - 25 ft.
SOIL : (CL) Yellowish brown clay w/ occ. f. gravel

	Initial	Final	As Rec'd
wet density (pcf) =	121.7		
dry density (pcf) =	96.4	101.4	
moisture (%) =	26.1	26.5	

SigN = 2500 psf

Load cell = 1.0 lbs / %
Shearing rate = 0.05 in./ hr.





SHEAR DEFL. (in.)	AXIAL DEFL. (in.)	SHEAR STRESS (Psf)
0.0000	0.0000	0.0
0.0004	0.0000	40.8
0.0008	-0.0001	88.0
0.0017	-0.0002	163.4
0.0034	-0.0005	273.3
0.0061	-0.0010	389.5
0.0096	-0.0017	534.0
0.0157	-0.0026	706.8
0.0225	-0.0033	860.7
0.0308	-0.0041	989.5
0.0423	-0.0056	1108.9
0.0526	-0.0071	1178.0
0.0613	-0.0086	1225.1
0.0716	-0.0100	1278.5
0.0821	-0.0113	1319.4
0.0935	-0.0126	1357.1
0.1029	-0.0137	1379.1
0.1129	-0.0146	1394.8
0.1234	-0.0151	1262.8
0.1317	-0.0153	1234.6
0.1454	-0.0154	1206.3
0.1538	-0.0155	1193.7
0.1638	-0.0155	1209.4
0.1738	-0.0155	1187.4
0.1854	-0.0156	1181.2
0.1992	-0.0156	1168.6
0.2104	-0.0157	1178.0
0.2254	-0.0157	1181.2

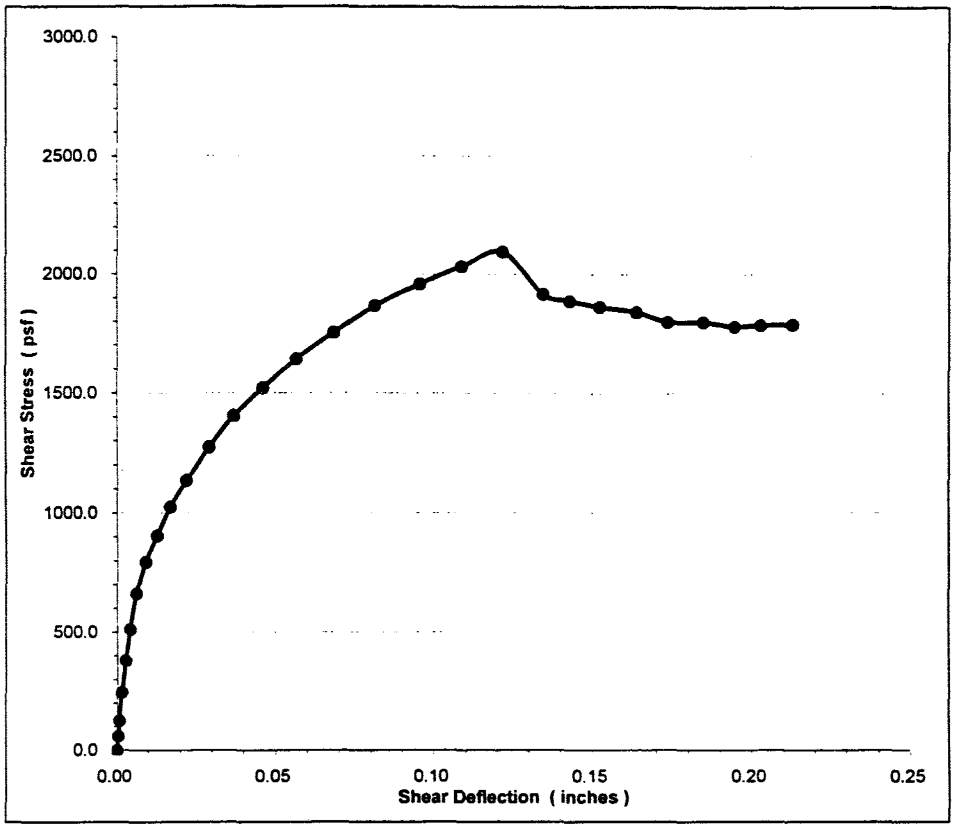
CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

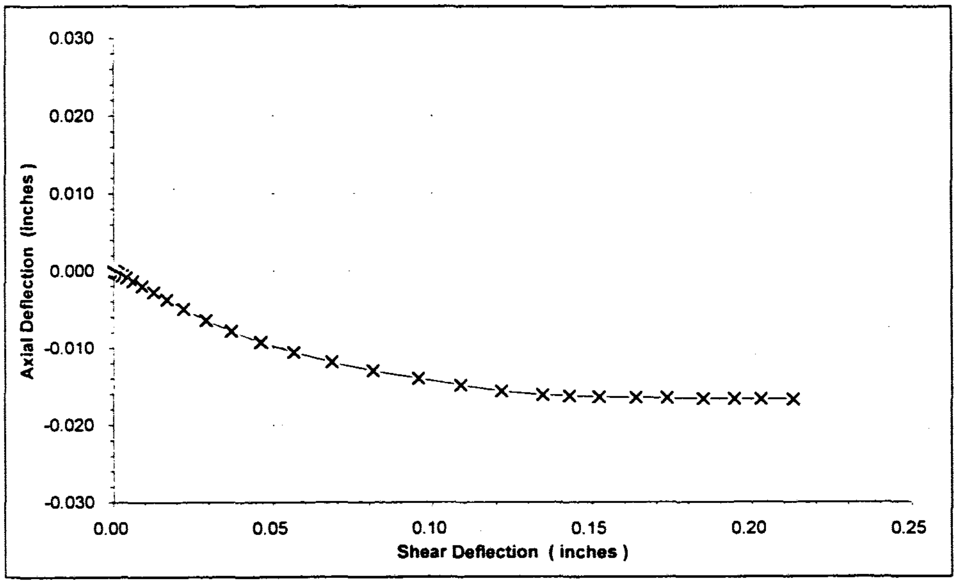
PROJECT : Thompson Creek
JOB NO. : –
SAMPLE ID : DH-5 S-2 @ 23.5 - 25 ft.
SOIL : (CL) Yellowish brown clay w/ occ. f. gravel

	Initial	Final	As Rec'd
wet density (pcf) =	124.8		
dry density (pcf) =	101.9	111.2	
moisture (%) =	22.5	20.6	

SigN = 4000 psf

Load cell = 1.0 lbs / %
Shearing rate = 0.05 in./ hr.





SHEAR DEFL. (in.)	AXIAL DEFL. (in.)	SHEAR STRESS (Psf)
0.0000	0.0000	0.0
0.0004	-0.0001	59.7
0.0008	-0.0002	125.7
0.0016	-0.0003	245.0
0.0028	-0.0006	380.1
0.0042	-0.0008	512.0
0.0063	-0.0013	662.8
0.0092	-0.0020	794.8
0.0128	-0.0028	904.7
0.0169	-0.0038	1024.1
0.0221	-0.0050	1134.0
0.0292	-0.0064	1272.3
0.0370	-0.0079	1404.2
0.0463	-0.0093	1520.4
0.0565	-0.0106	1639.8
0.0683	-0.0119	1752.9
0.0813	-0.0130	1866.0
0.0956	-0.0140	1957.1
0.1089	-0.0149	2032.5
0.1217	-0.0156	2095.3
0.1346	-0.0161	1916.2
0.1429	-0.0163	1888.0
0.1524	-0.0164	1862.8
0.1638	-0.0165	1840.8
0.1735	-0.0165	1800.0
0.1848	-0.0166	1800.0
0.1946	-0.0166	1781.2
0.2029	-0.0167	1787.4
0.2129	-0.0167	1790.6

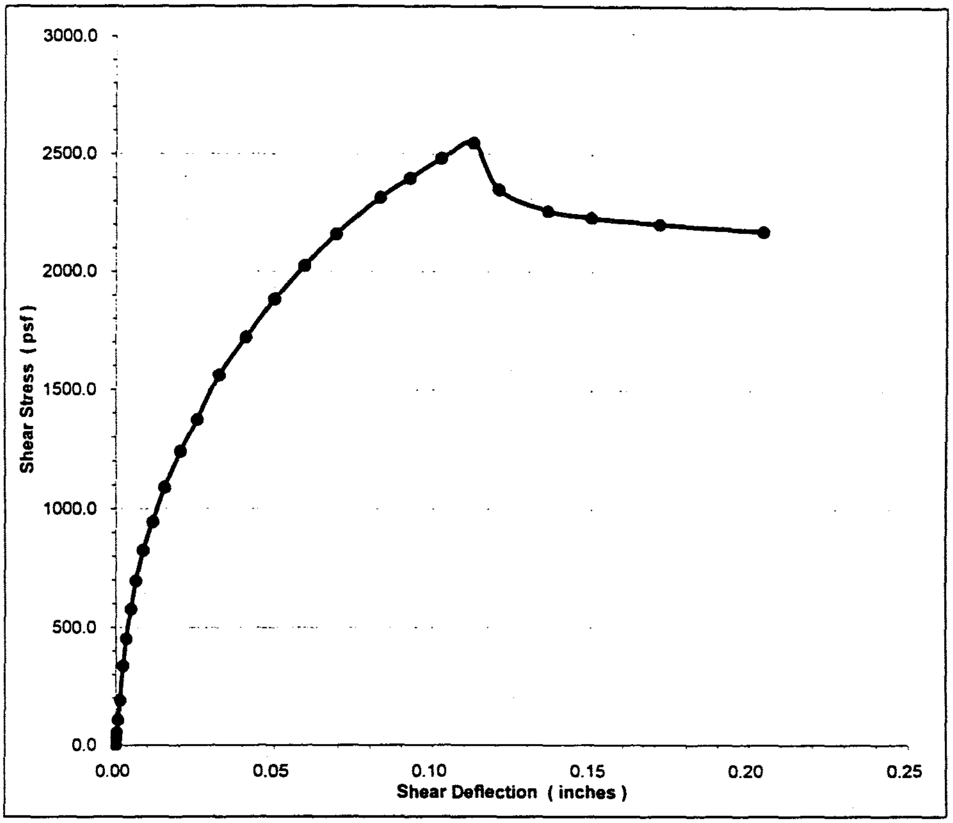
CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

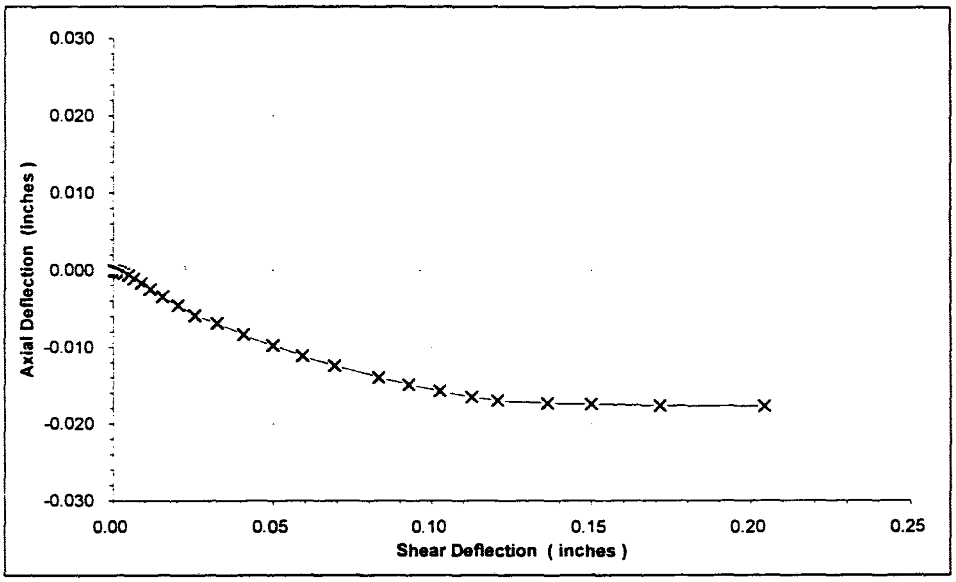
PROJECT : Thompson Creek
JOB NO. : –
SAMPLE ID : DH-5 S-2 @ 23.5 - 25 ft.
SOIL : (CL) Yellowish brown clay w/ occ. f. gravel

	Initial	Final	As Rec'd
wet density (pcf) =	123.4		
dry density (pcf) =	98.5	108.9	
moisture (%) =	25.3	22.1	

SigN = 5000 psf

Load cell = 1.0 lbs / %
Shearing rate = 0.025 in./ hr.





SHEAR DEFL. (in.)	AXIAL DEFL. (in.)	SHEAR STRESS (Psf)
0.0000	0.0000	0.0
0.0002	-0.0001	28.3
0.0004	-0.0001	53.4
0.0008	-0.0001	106.8
0.0015	-0.0002	191.6
0.0024	-0.0003	336.1
0.0034	-0.0005	452.4
0.0048	-0.0007	578.0
0.0065	-0.0011	697.4
0.0088	-0.0017	826.2
0.0117	-0.0025	945.5
0.0155	-0.0035	1090.1
0.0204	-0.0046	1240.8
0.0257	-0.0059	1372.8
0.0326	-0.0069	1561.3
0.0410	-0.0084	1721.5
0.0501	-0.0098	1881.7
0.0593	-0.0112	2023.0
0.0693	-0.0125	2158.1
0.0831	-0.0140	2315.2
0.0926	-0.0149	2396.9
0.1026	-0.0158	2481.7
0.1128	-0.0166	2547.6
0.1208	-0.0171	2349.7
0.1364	-0.0174	2258.6
0.1500	-0.0175	2230.4
0.1714	-0.0177	2202.1
0.2043	-0.0178	2173.8

CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

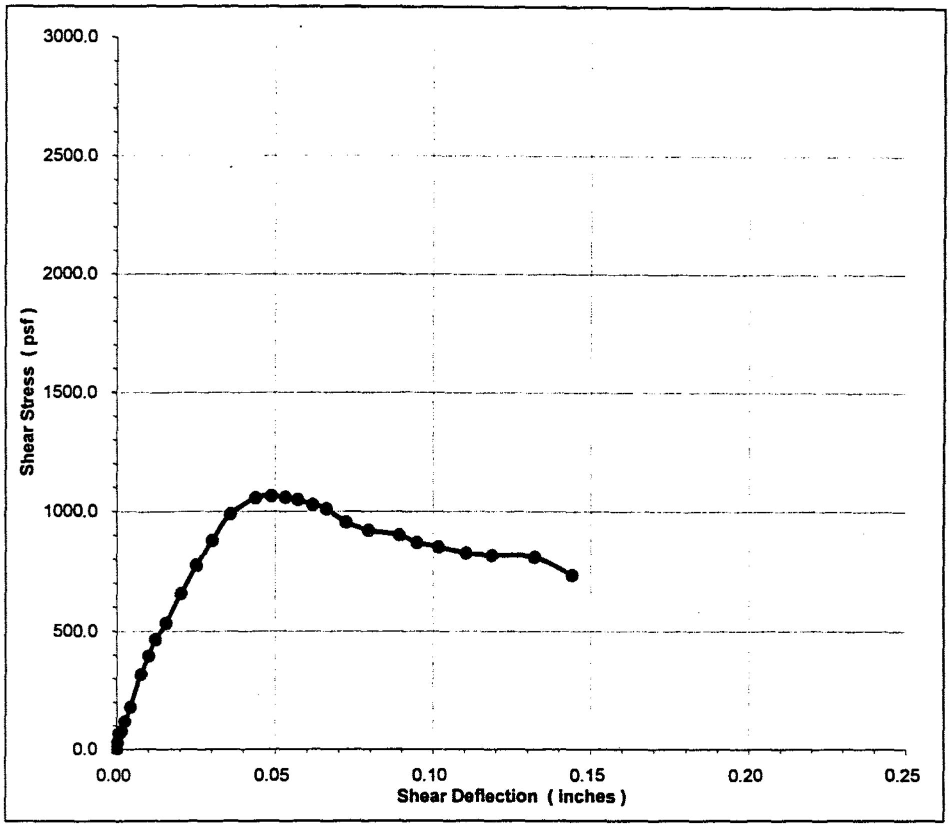
PROJECT : Thompson Creek
JOB NO. : –
SAMPLE ID : DH-9 L2a @ 5.5 - 6 ft.
SOIL : (CL) Dark brown sandy clay w/ somr f. gravel

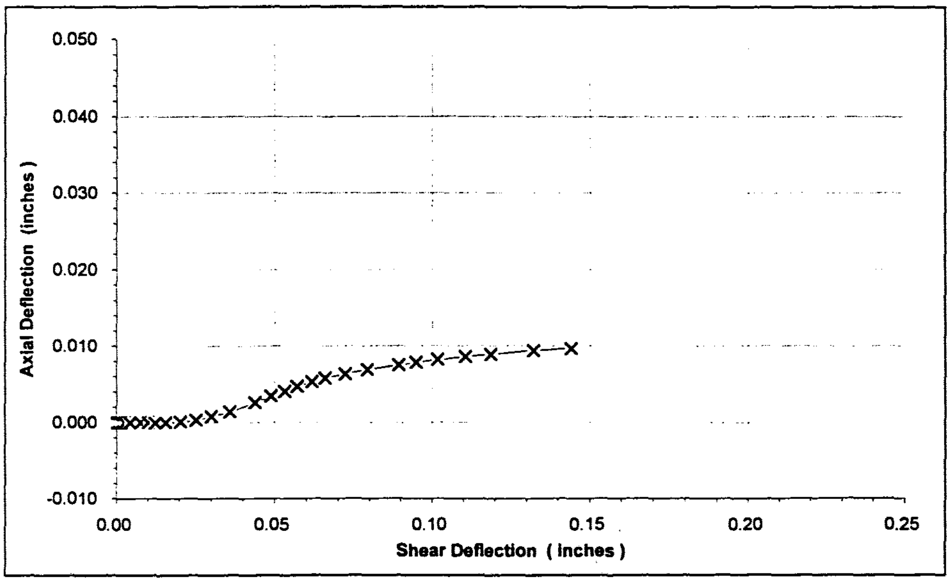
	Initial	Final	As Rec'd
wet density (pcf) =	133.2		
dry density (pcf) =	118.6	118.9	
moisture (%) =	12.3	15.8	11.9

SigN = 1000 psf

Load cell = 1.0 lbs / %
Shearing rate = 0.025 in./ hr.

SHEAR DEFL. (in.)	AXIAL DEFL. (in.)	SHEAR STRESS (Psf)
0.0000	0.0000	0.0
0.0003	0.0000	28.3
0.0007	0.0000	66.0
0.0013	0.0000	72.3
0.0017	0.0000	78.5
0.0026	0.0000	119.4
0.0043	0.0000	179.1
0.0078	0.0000	317.3
0.0102	0.0000	395.8
0.0123	0.0000	464.9
0.0156	0.0000	534.0
0.0204	0.0001	656.5
0.0253	0.0003	775.9
0.0302	0.0008	879.6
0.0360	0.0014	989.5
0.0438	0.0026	1055.5
0.0488	0.0034	1064.9
0.0532	0.0041	1058.6
0.0571	0.0047	1049.2
0.0617	0.0053	1027.2
0.0659	0.0058	1011.5
0.0723	0.0063	955.0
0.0794	0.0069	920.4
0.0893	0.0075	901.6
0.0948	0.0078	870.2
0.1018	0.0082	851.3
0.1105	0.0086	826.2
0.1187	0.0089	816.8
0.1321	0.0094	810.5
0.1442	0.0097	735.1

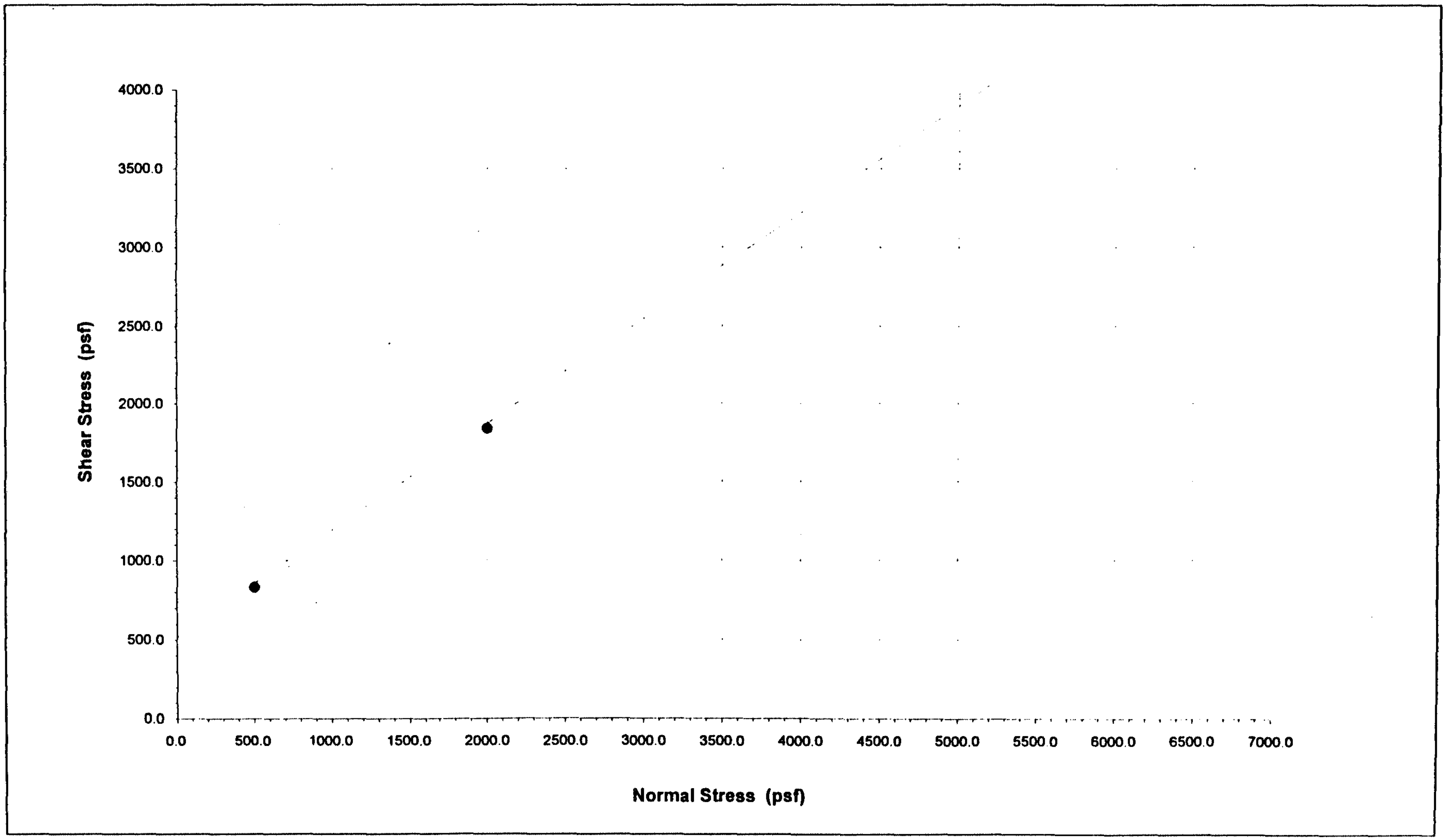




CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

PROJECT : Thompson Creek
JOB NO. : --
SAMPLE ID : DH-11 L 1b @ 3-3.5 ft.
SOIL : (CL) Dark brown gravelly clay

Normal Pressure (psf)	Shear Stress (psf)	Dry Density (pcf)	Initial moisture (%)
500	832.5	119.7	12.2
2000	1840.8	117.3	13.4



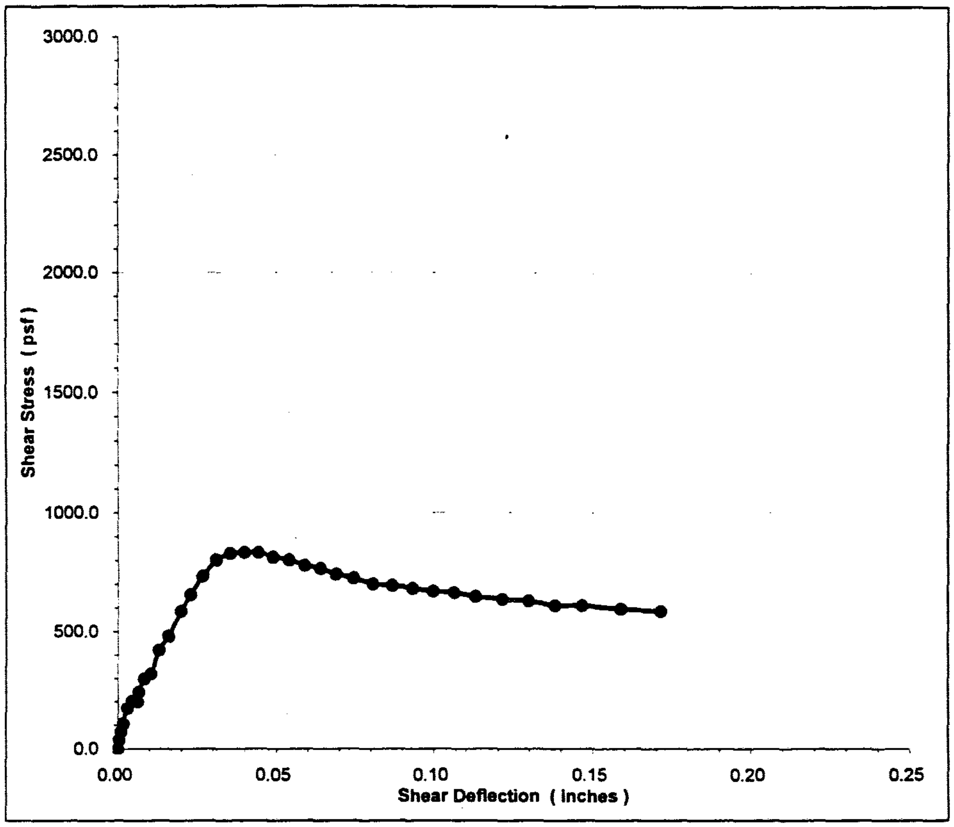
CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

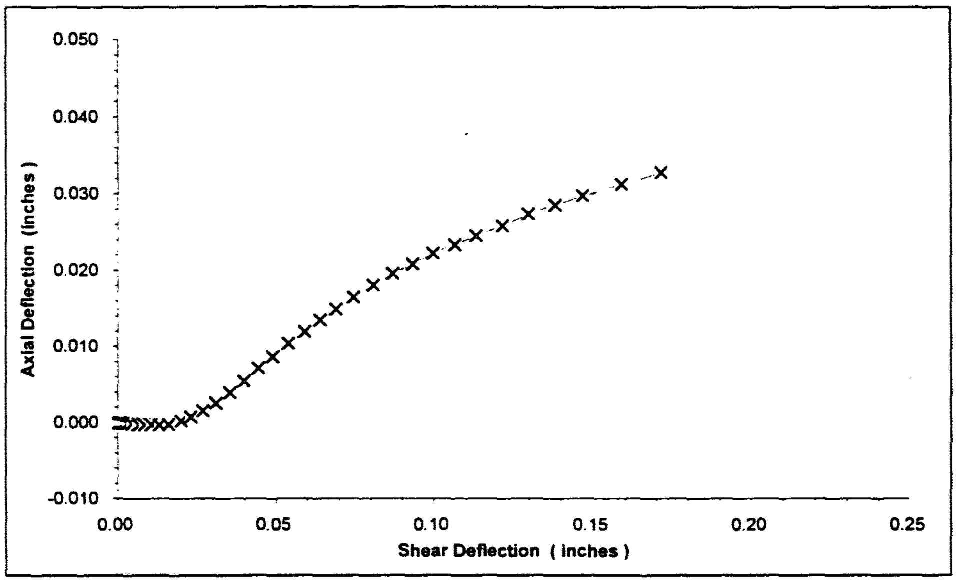
PROJECT : Thompson Creek
JOB NO. : –
SAMPLE ID : DH-11 L 1b @ 3-3.5 ft.
SOIL : (CL) Dark brown gravelly clay

	Initial	Final	As Rec'd
wet density (pcf) =	134.3		
dry density (pcf) =	119.7	116.7	
moisture (%) =	12.2	16.4	

SigN = 500 psf

Load cell = 1.0 lbs / %
Shearing rate = 0.025 in./ hr.





SHEAR DEFL. (in.)	AXIAL DEFL. (in.)	SHEAR STRESS (Psf)
0.0000	0.0000	0.0
0.0005	0.0000	37.7
0.0010	0.0000	72.3
0.0019	-0.0001	106.8
0.0030	-0.0002	172.8
0.0044	-0.0002	204.2
0.0063	-0.0003	201.0
0.0067	-0.0003	241.9
0.0085	-0.0003	298.4
0.0106	-0.0003	320.4
0.0131	-0.0004	420.9
0.0161	-0.0003	480.6
0.0200	0.0002	587.4
0.0232	0.0007	656.5
0.0269	0.0015	735.1
0.0311	0.0025	801.0
0.0355	0.0039	829.3
0.0398	0.0054	832.5
0.0444	0.0071	832.5
0.0490	0.0086	813.6
0.0540	0.0104	801.0
0.0590	0.0119	779.1
0.0640	0.0135	766.5
0.0690	0.0149	741.4
0.0746	0.0164	725.7
0.0809	0.0180	700.5
0.0870	0.0195	694.2
0.0934	0.0208	681.7
0.0998	0.0222	669.1
0.1065	0.0233	662.8
0.1132	0.0245	647.1
0.1215	0.0258	634.6
0.1298	0.0273	628.3
0.1382	0.0285	609.4
0.1467	0.0297	609.4
0.1590	0.0312	593.7
0.1715	0.0327	584.3

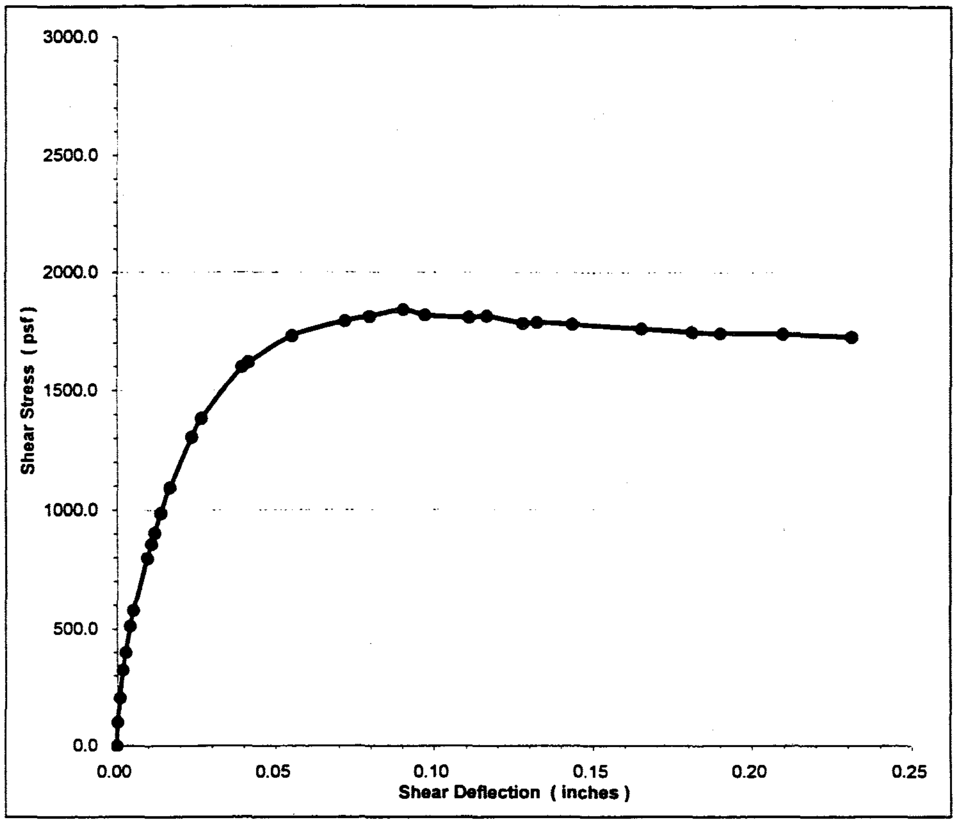
CONSOLIDATED DIRECT SHEAR TEST (inundated, & slow shearing)

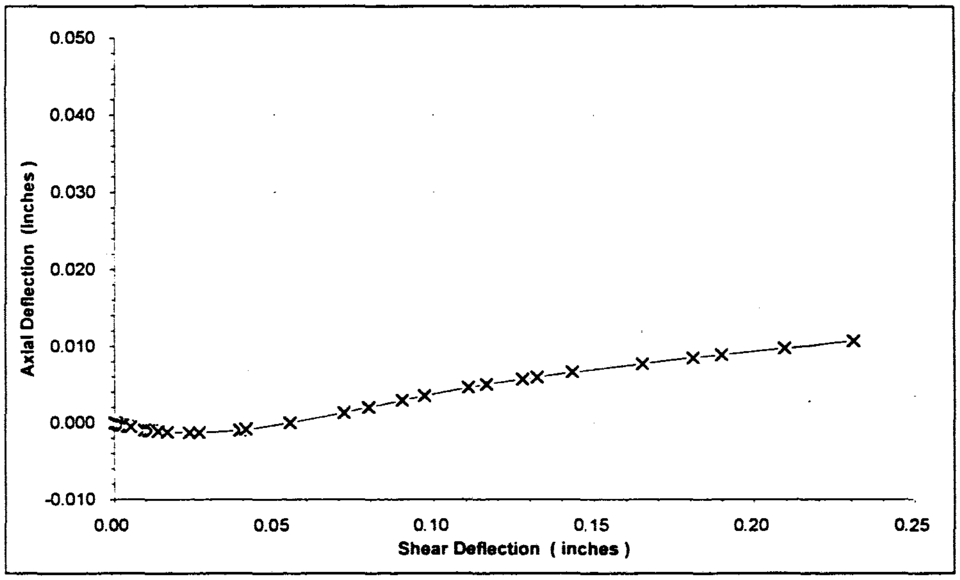
PROJECT : Thompson Creek
JOB NO. : –
SAMPLE ID : DH-11 L 1b @ 3-3.5 ft.
SOIL : (CL) Dark brown gravelly clay

	Initial	Final	As Rec'd
wet density (pcf) =	132.9		
dry density (pcf) =	117.3	118.2	
moisture (%) =	13.4	16.5	

SigN = 2000 psf

Load cell = 1.0 lbs / %
Shearing rate = 0.025 in./ hr.



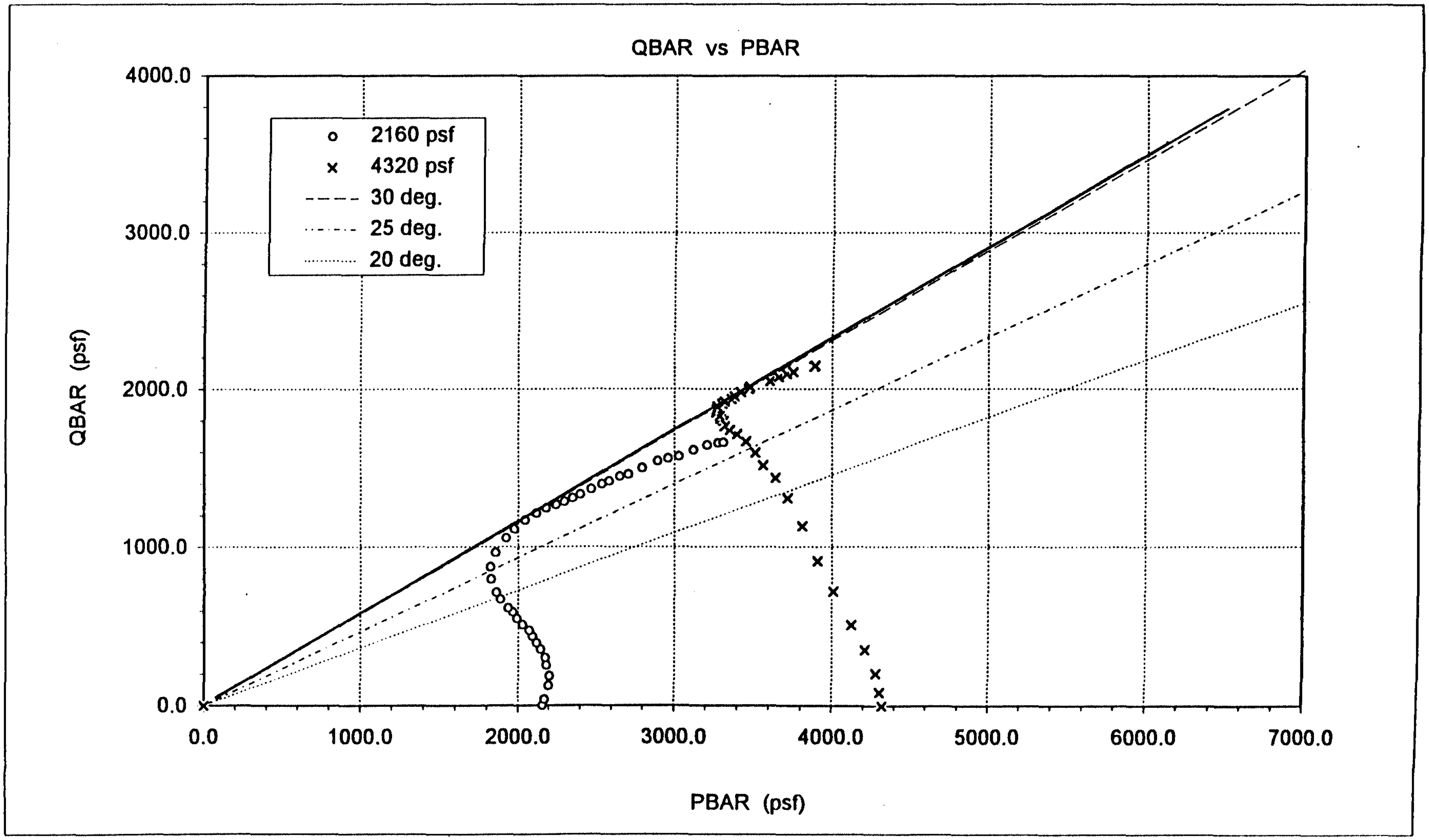


SHEAR DEFL. (in.)	AXIAL DEFL. (in.)	SHEAR STRESS (Psf)
0.0000	0.0000	0.0
0.0003	0.0000	100.5
0.0009	-0.0001	204.2
0.0019	-0.0003	323.6
0.0028	-0.0003	399.0
0.0042	-0.0005	512.0
0.0053	-0.0005	578.0
0.0096	-0.0009	797.9
0.0109	-0.0010	857.6
0.0119	-0.0010	904.7
0.0138	-0.0011	986.4
0.0167	-0.0012	1093.2
0.0235	-0.0013	1303.7
0.0266	-0.0013	1382.2
0.0393	-0.0010	1599.0
0.0412	-0.0009	1617.8
0.0551	0.0000	1730.9
0.0717	0.0013	1793.7
0.0795	0.0020	1812.6
0.0901	0.0029	1840.8
0.0971	0.0035	1818.8
0.1108	0.0046	1809.4
0.1165	0.0050	1815.7
0.1277	0.0057	1784.3
0.1323	0.0060	1787.4
0.1433	0.0066	1781.2
0.1650	0.0077	1762.3
0.1809	0.0085	1746.6
0.1899	0.0089	1743.5
0.2095	0.0097	1740.3
0.2310	0.0107	1727.7

CONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TESTS WITH PORE PRESSURE MEASUREMENT

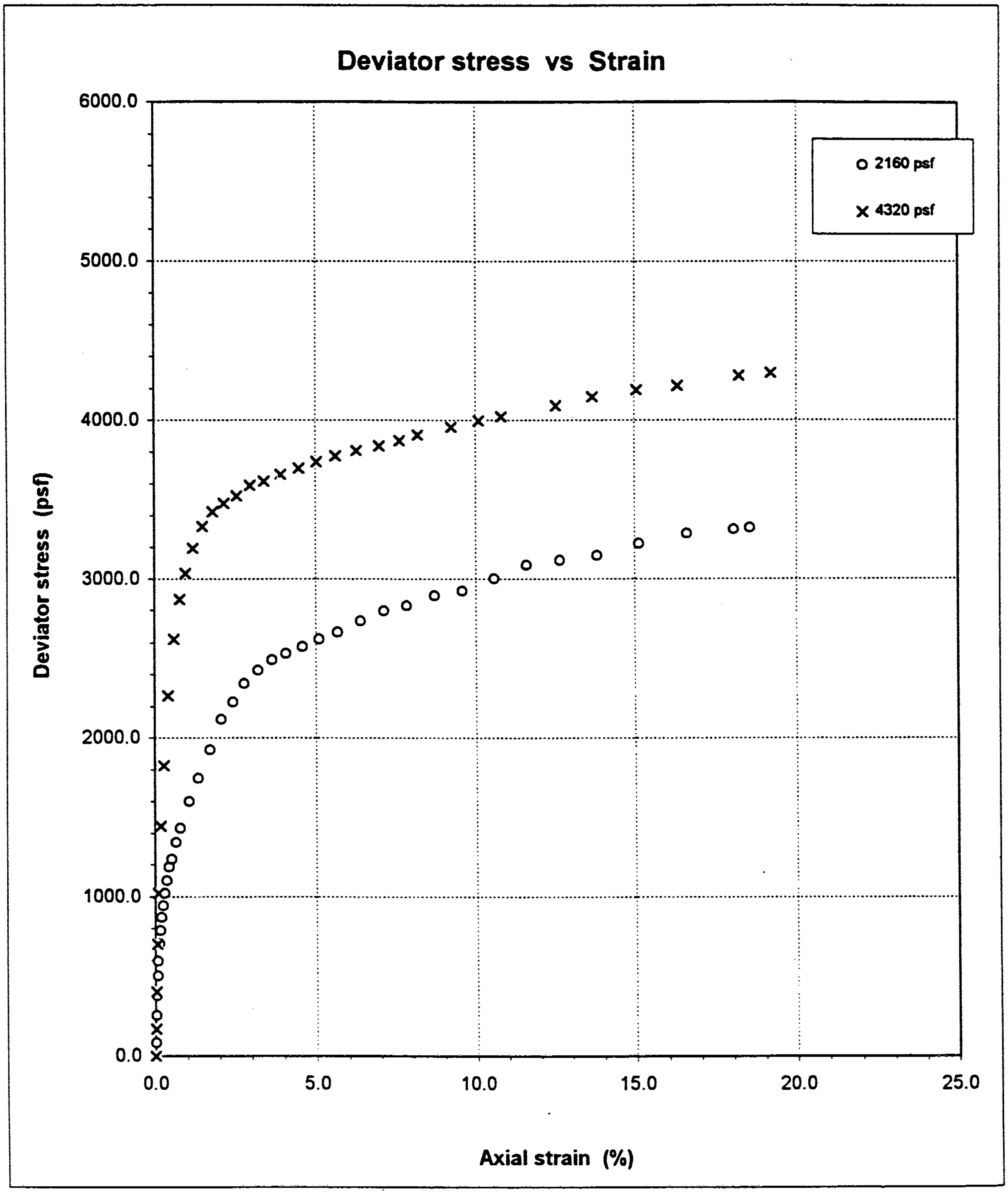
CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 1
SAMPLE NUMBER: S - 2
DEPTH (ft.): 18 - 20
SOIL TYPE: (CL/CH) Brown clay, tr. f. gravel

c = 0 psf
$\phi' = 36.0$ deg.



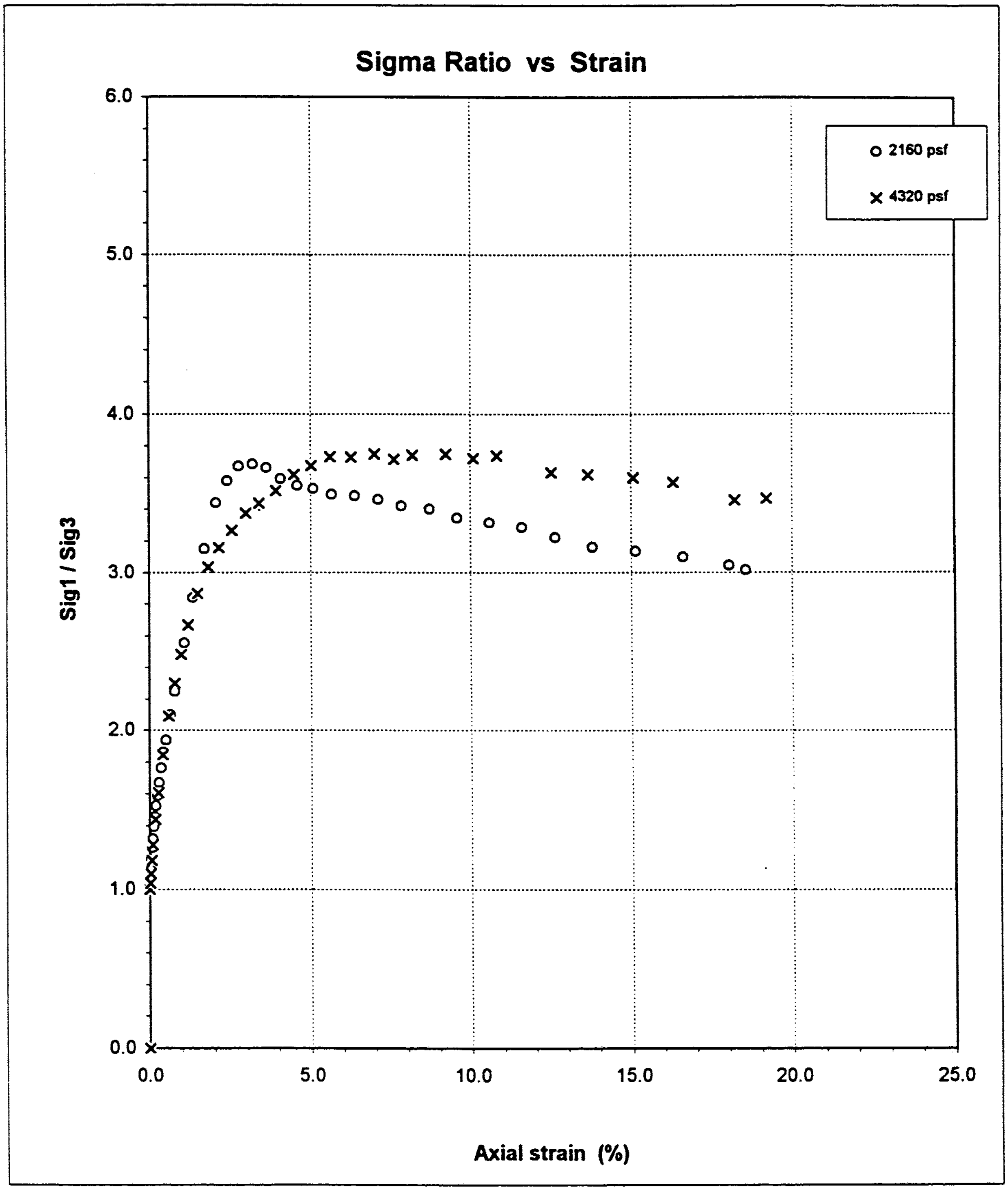
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 1
SAMPLE NUMBER: S - 2
DEPTH (ft.): 18 - 20
SOIL TYPE: (CL/CH) Brown clay, tr. f. gravel



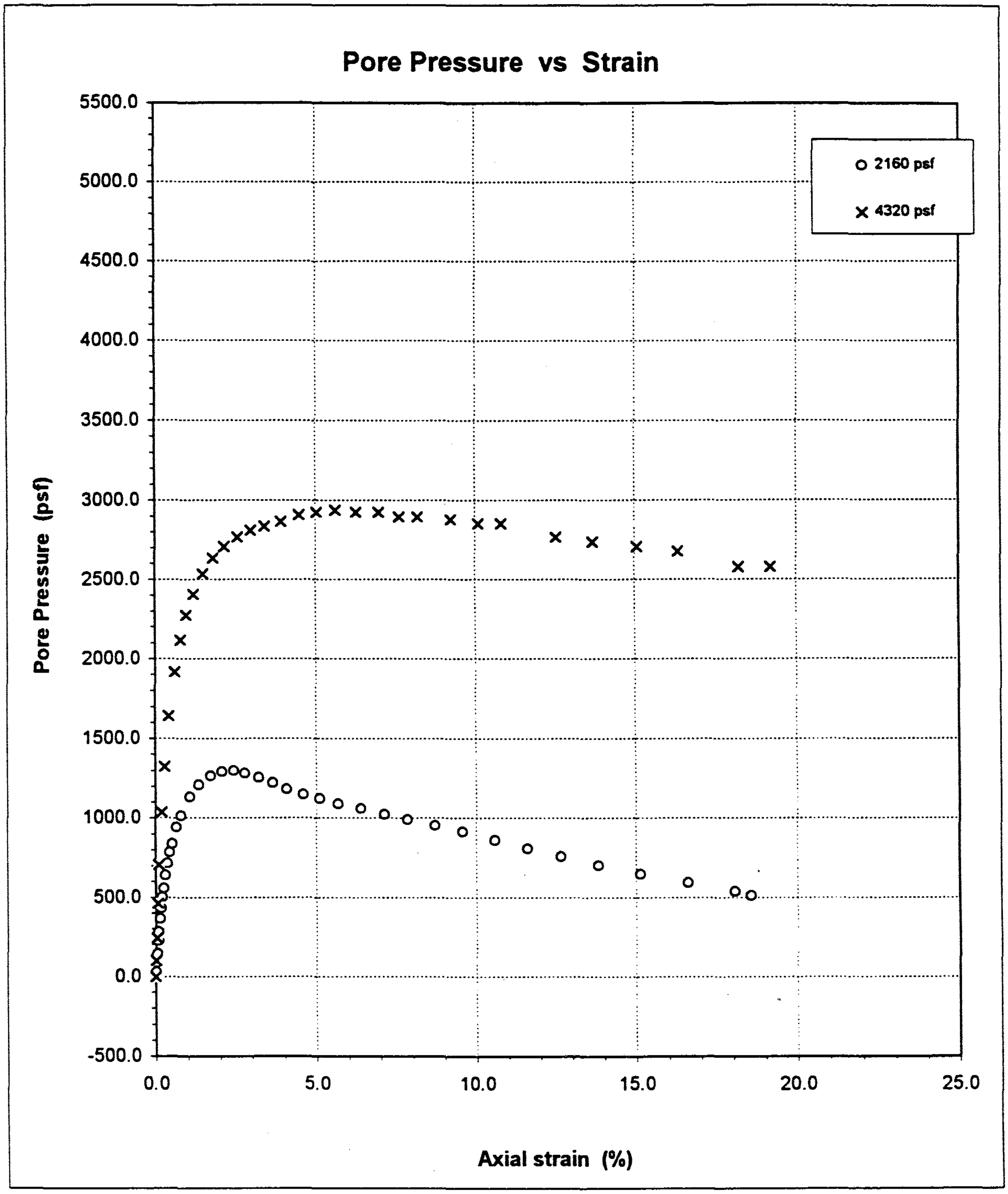
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 1
SAMPLE NUMBER: S - 2
DEPTH (ft.): 18 - 20
SOIL TYPE: (CL/CH) Brown clay, tr. f. gravel



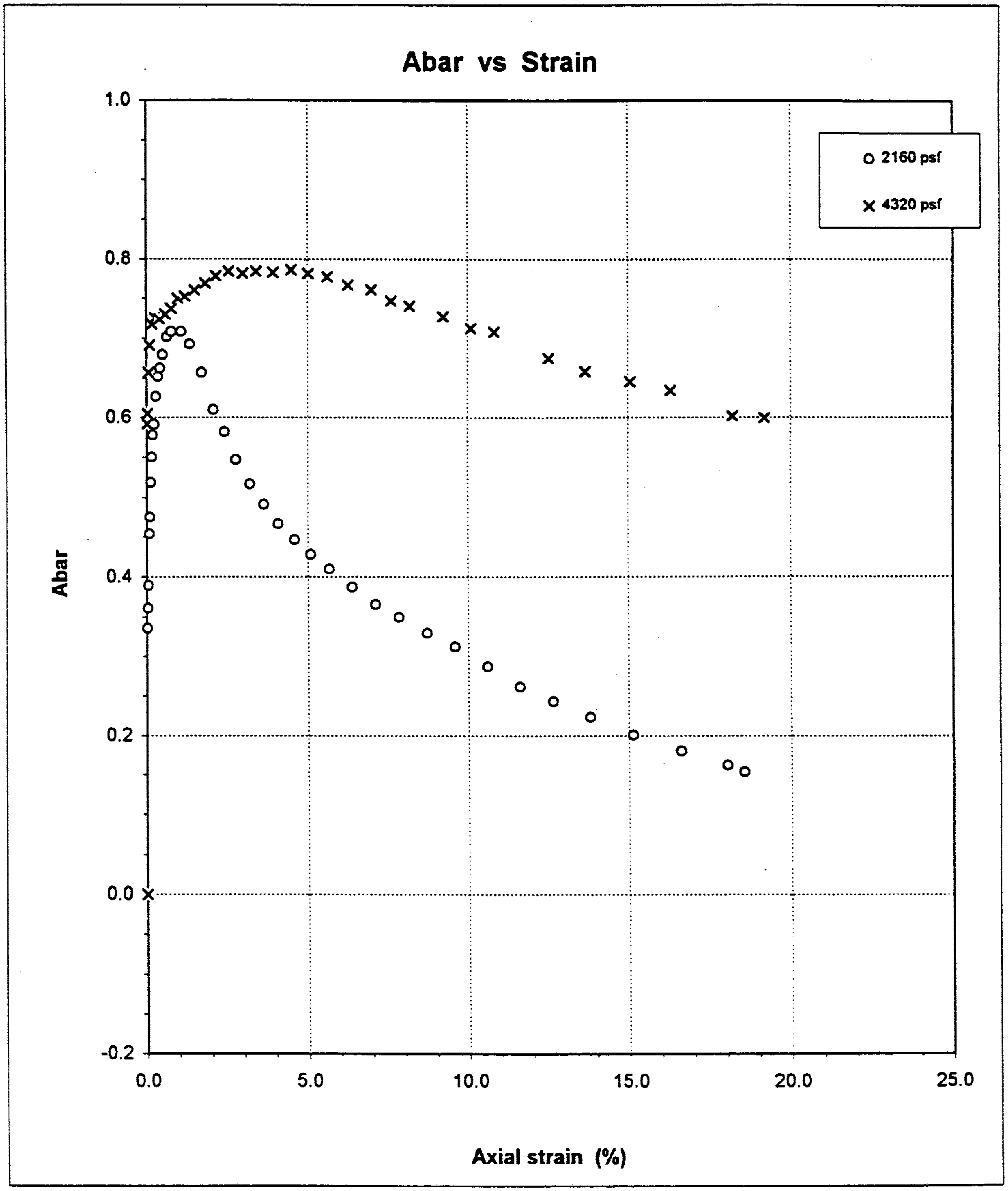
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 1
SAMPLE NUMBER: S - 2
DEPTH (ft.): 18 - 20
SOIL TYPE: (CL/CH) Brown clay, tr. f. gravel



TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 1
SAMPLE NUMBER: S - 2
DEPTH (ft.): 18 - 20
SOIL TYPE: (CL/CH) Brown clay, tr. f. gravel



TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 1
SAMPLE NUMBER: S - 2
DEPTH (ft.): 18 - 20
SOIL TYPE: (CL/CH) Brown clay, tr. f. gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	1338.1	1346.0	
HEIGHT(in.) =	6.000	5.906	
AREA(sq.in.) =	6.544	6.556	
VOLUME(c.c.) =	643.44	634.54	
WET DENSITY (Pcf) =	129.8	132.4	
DRY DENSITY (Pcf) =	110.4	112.0	
MOISTURE (%) =	17.5	18.2	
Gs (Assumed) =	2.70		
VOID RATIO =	0.526	0.504	
% SATURATION =	89.9	97.4	

DATA REDUCTIONS:

LOAD FACTOR = 0.1238589
DISPL. FACTOR = 0.0002997
P.W.P. FACTOR = 0.031711
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 2160 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	2160.0	2160.0	1.00	2160.0	0.0	0.00
0.01	81.6	27.4	2132.6	2214.2	1.04	2173.4	40.8	0.34
0.03	252.9	91.3	2068.7	2321.6	1.12	2195.1	126.5	0.36
0.05	375.2	146.1	2013.9	2389.1	1.19	2201.5	187.6	0.39
0.08	502.9	228.3	1931.7	2434.6	1.26	2183.1	251.4	0.45
0.09	595.2	283.1	1876.9	2472.1	1.32	2174.5	297.6	0.48
0.13	703.7	365.3	1794.7	2498.4	1.39	2146.5	351.8	0.52
0.16	787.6	433.8	1726.2	2513.8	1.46	2120.0	393.8	0.55
0.20	868.7	502.3	1657.7	2526.4	1.52	2092.1	434.4	0.58
0.24	941.7	557.1	1602.9	2544.6	1.59	2073.7	470.8	0.59
0.29	1019.8	639.3	1520.7	2540.5	1.67	2030.6	509.9	0.63
0.37	1100.4	716.9	1443.1	2543.5	1.76	1993.3	550.2	0.65
0.44	1186.3	785.4	1374.6	2560.9	1.86	1967.7	593.2	0.66
0.51	1236.9	840.2	1319.8	2556.7	1.94	1938.2	618.4	0.68
0.64	1340.6	940.7	1219.3	2559.9	2.10	1889.6	670.3	0.70
0.79	1430.4	1013.7	1146.3	2576.7	2.25	1861.5	715.2	0.71
1.07	1598.6	1132.5	1027.5	2626.1	2.56	1826.8	799.3	0.71
1.35	1747.0	1210.1	949.9	2696.9	2.84	1823.4	873.5	0.69
1.71	1925.3	1264.9	895.1	2820.4	3.15	1857.7	962.6	0.66
2.07	2118.0	1292.3	867.7	2985.7	3.44	1926.7	1059.0	0.61
2.42	2227.1	1296.9	863.1	3090.3	3.58	1976.7	1113.6	0.58
2.77	2343.4	1283.2	876.8	3220.3	3.67	2048.6	1171.7	0.55
3.20	2427.8	1255.8	904.2	3332.1	3.68	2118.2	1213.9	0.52
3.63	2493.0	1223.8	936.2	3429.2	3.66	2182.7	1246.5	0.49
4.07	2533.8	1182.7	977.3	3511.1	3.59	2244.2	1266.9	0.47
4.59	2574.8	1150.7	1009.3	3584.0	3.55	2296.7	1287.4	0.45
5.09	2623.1	1123.3	1036.7	3659.7	3.53	2348.2	1311.5	0.43
5.67	2663.7	1091.4	1068.6	3732.3	3.49	2400.5	1331.8	0.41
6.39	2732.4	1059.4	1100.6	3833.0	3.48	2466.8	1366.2	0.39
7.11	2797.3	1022.9	1137.1	3934.4	3.46	2535.8	1398.7	0.37
7.84	2830.6	990.9	1169.1	3999.7	3.42	2584.4	1415.3	0.35
8.71	2893.1	954.4	1205.6	4098.7	3.40	2652.2	1446.5	0.33
9.58	2922.1	913.3	1246.7	4168.9	3.34	2707.8	1461.1	0.31
10.59	3001.4	863.1	1296.9	4298.3	3.31	2797.6	1500.7	0.29
11.61	3087.4	808.3	1351.7	4439.1	3.28	2895.4	1543.7	0.26
12.65	3117.8	758.0	1402.0	4519.7	3.22	2960.9	1558.9	0.24
13.82	3148.6	703.2	1456.8	4605.4	3.16	3031.1	1574.3	0.22
15.13	3222.9	648.4	1511.6	4734.5	3.13	3123.0	1611.5	0.20
16.61	3287.1	593.6	1566.4	4853.5	3.10	3209.9	1643.5	0.18
18.04	3313.0	538.8	1621.2	4934.1	3.04	3277.6	1656.5	0.16
18.55	3321.5	511.4	1648.6	4970.0	3.01	3309.3	1660.7	0.15

TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 1
SAMPLE NUMBER: S - 2
DEPTH (ft.): 18 - 20
SOIL TYPE: (CL/CH) Brown clay, tr. f. gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	1361.1	1360.4	
HEIGHT(in.) =	5.980	5.917	
AREA(sq.in.) =	6.535	6.464	
VOLUME(c.c.) =	640.41	626.71	
WET DENSITY (Pcf) =	132.6	135.5	
DRY DENSITY (Pcf) =	112.7	115.2	
MOISTURE (%) =	17.7	17.6	
Gs (Assumed) =	2.70		
VOID RATIO =	0.495	0.463	
% SATURATION =	96.4	102.7	

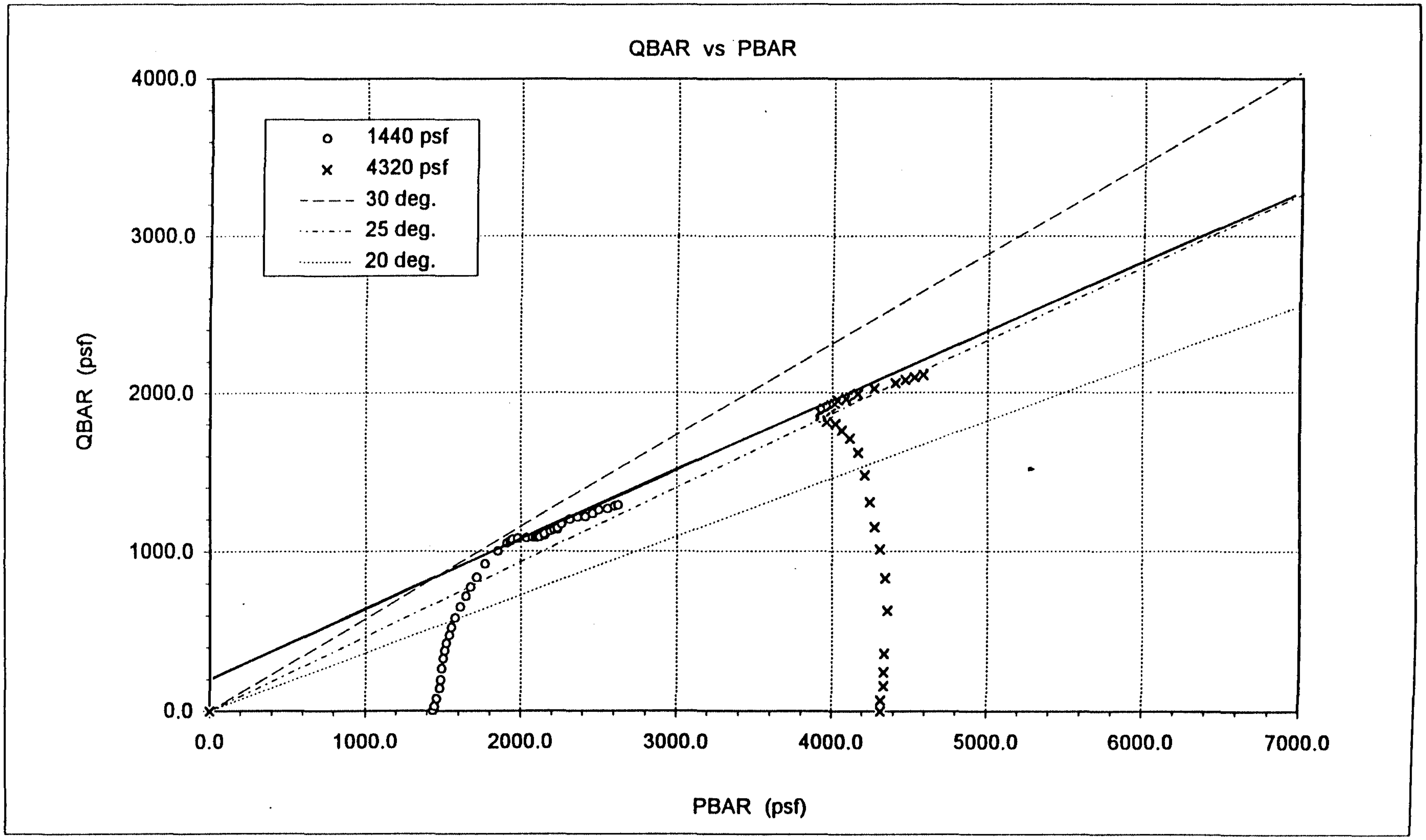
DATA REDUCTIONS:

LOAD FACTOR = 9.55
DISPL. FACTOR = 0.001
P.W.P. FACTOR = 1.0
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 4320 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	4320.0	4320.0	1.00	4320.0	0.0	0.00
0.01	170.2	100.8	4219.2	4389.4	1.04	4304.3	85.1	0.59
0.03	404.1	244.8	4075.2	4479.3	1.10	4277.3	202.1	0.61
0.06	701.7	460.8	3859.2	4560.9	1.18	4210.0	350.8	0.66
0.10	1020.1	705.6	3614.4	4634.5	1.28	4124.5	510.1	0.69
0.18	1444.1	1036.8	3283.2	4727.3	1.44	4005.3	722.1	0.72
0.28	1824.6	1324.8	2995.2	4819.8	1.61	3907.5	912.3	0.73
0.42	2266.8	1641.6	2678.4	4945.2	1.85	3811.8	1133.4	0.72
0.60	2622.2	1915.2	2404.8	5027.0	2.09	3715.9	1311.1	0.73
0.79	2870.6	2116.8	2203.2	5073.8	2.30	3638.5	1435.3	0.74
0.97	3033.8	2275.2	2044.8	5078.6	2.48	3561.7	1516.9	0.75
1.20	3195.0	2404.8	1915.2	5110.2	2.67	3512.7	1597.5	0.75
1.50	3332.1	2534.4	1785.6	5117.7	2.87	3451.6	1666.0	0.76
1.82	3425.7	2635.2	1684.8	5110.5	3.03	3397.6	1712.8	0.77
2.15	3476.3	2707.2	1612.8	5089.1	3.16	3351.0	1738.2	0.78
2.56	3524.1	2764.8	1555.2	5079.3	3.27	3317.3	1762.1	0.78
2.98	3591.4	2808.0	1512.0	5103.4	3.38	3307.7	1795.7	0.78
3.41	3616.8	2836.8	1483.2	5100.0	3.44	3291.6	1808.4	0.78
3.93	3658.5	2865.6	1454.4	5112.9	3.52	3283.7	1829.3	0.78
4.49	3698.3	2908.8	1411.2	5109.5	3.62	3260.3	1849.1	0.79
5.03	3737.9	2923.2	1396.8	5134.7	3.68	3265.8	1869.0	0.78
5.62	3774.9	2937.6	1382.4	5157.3	3.73	3269.8	1887.4	0.78
6.26	3809.0	2923.2	1396.8	5205.8	3.73	3301.3	1904.5	0.77
6.99	3838.9	2923.2	1396.8	5235.7	3.75	3316.2	1919.4	0.76
7.61	3872.0	2894.4	1425.6	5297.6	3.72	3361.6	1936.0	0.75
8.19	3906.5	2894.4	1425.6	5332.1	3.74	3378.9	1953.3	0.74
9.24	3958.5	2880.0	1440.0	5398.5	3.75	3419.2	1979.2	0.73
10.10	3997.4	2851.2	1468.8	5466.2	3.72	3467.5	1998.7	0.71
10.83	4022.0	2851.2	1468.8	5490.8	3.74	3479.8	2011.0	0.71
12.53	4093.9	2764.8	1555.2	5649.1	3.63	3602.1	2046.9	0.68
13.68	4150.3	2736.0	1584.0	5734.3	3.62	3659.1	2075.1	0.66
15.07	4192.0	2707.2	1612.8	5804.8	3.60	3708.8	2096.0	0.65
16.32	4219.3	2678.4	1641.6	5860.9	3.57	3751.3	2109.7	0.63
18.21	4280.5	2577.6	1742.4	6022.9	3.46	3882.6	2140.2	0.60
19.19	4297.9	2577.6	1742.4	6040.3	3.47	3891.4	2149.0	0.60

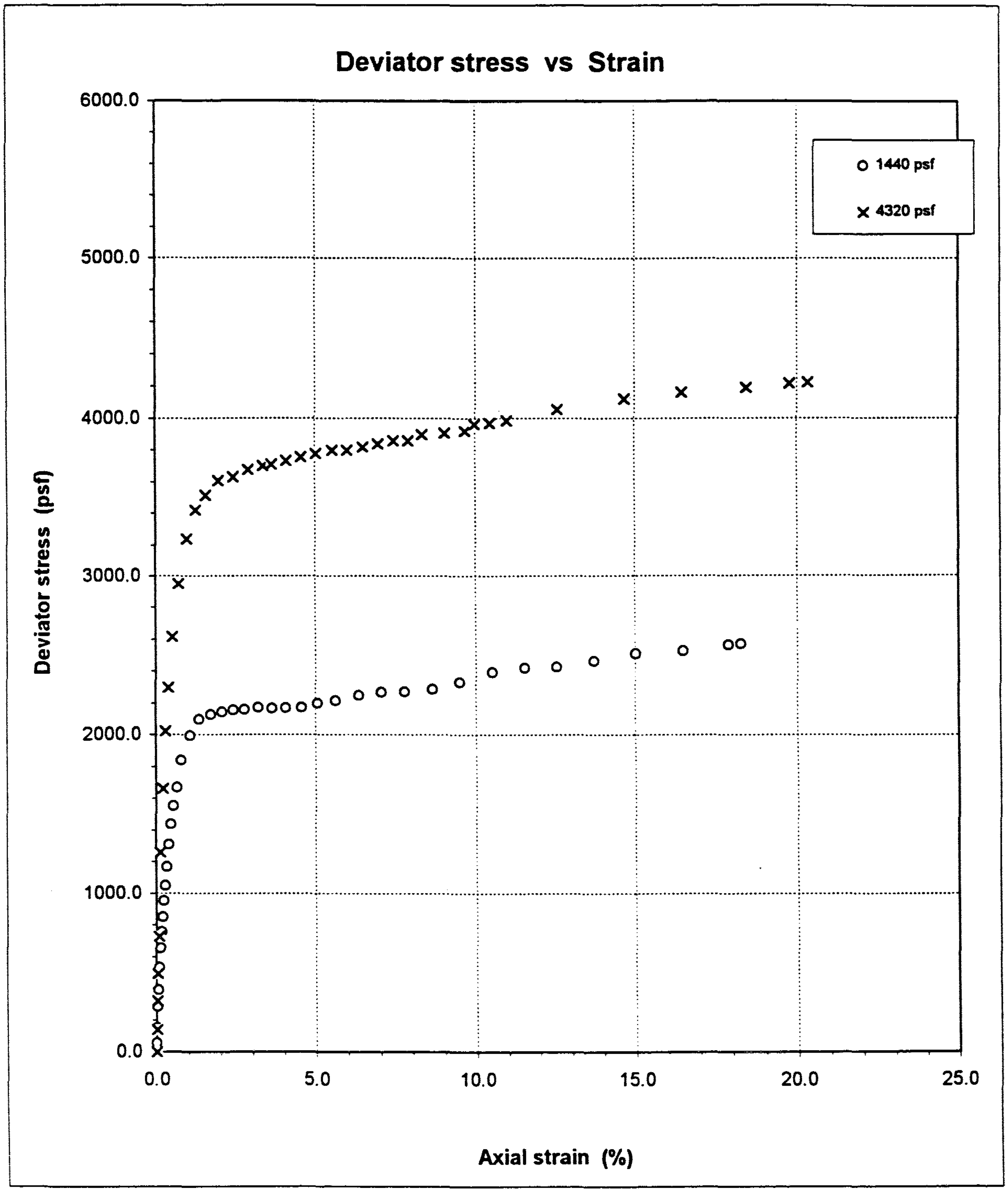
CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 2
SAMPLE NUMBER: S - 2
DEPTH (ft.): 12 - 14
SOIL TYPE: (CL) Brown w/ some gray clay, tr. f. gravel

c = 225 psf
ϕ' = 28.3 deg.



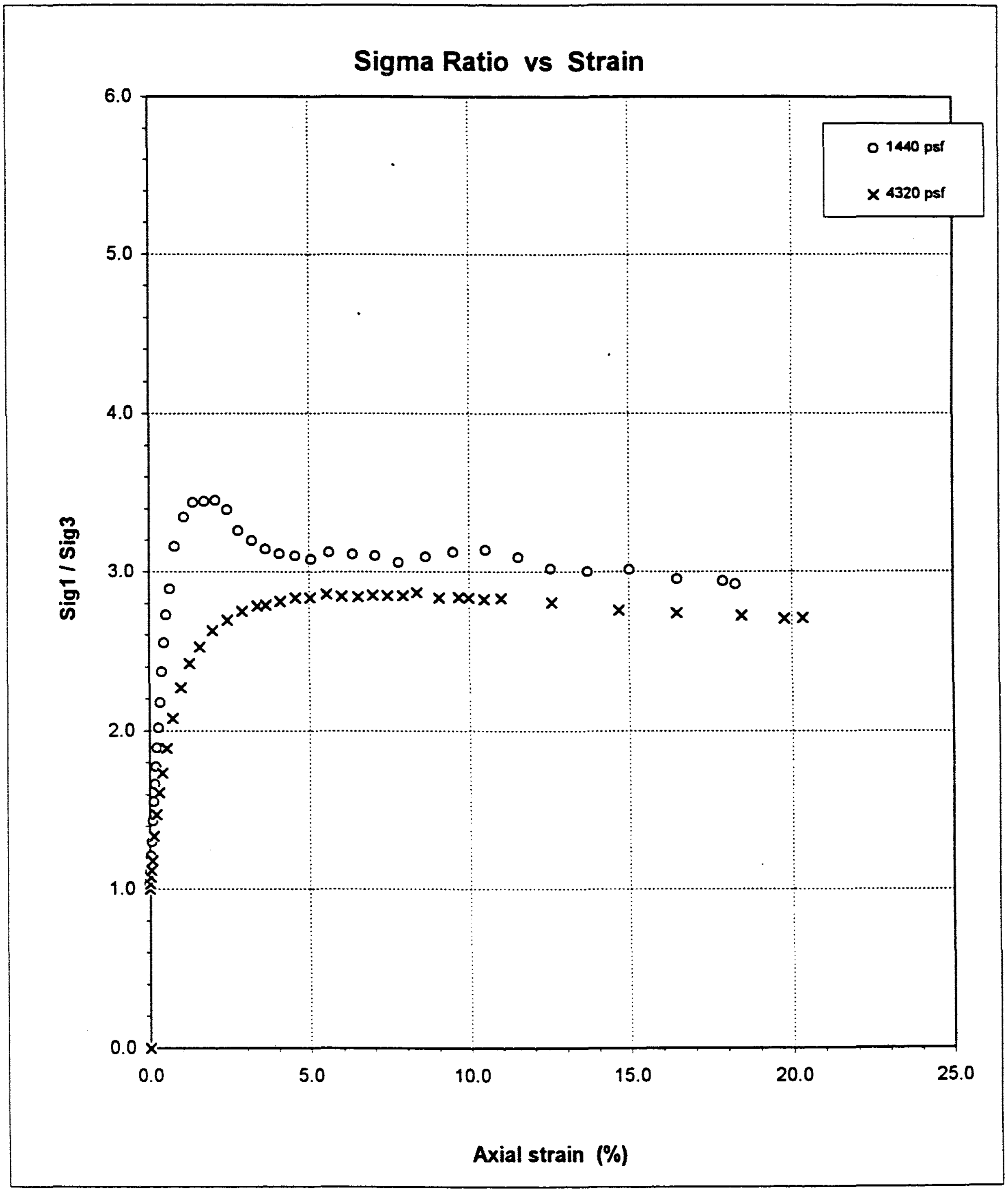
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 2
SAMPLE NUMBER: S - 2
DEPTH (ft.): 12 - 14
SOIL TYPE: (CL) Brown w/ some gray clay, tr. f. gravel



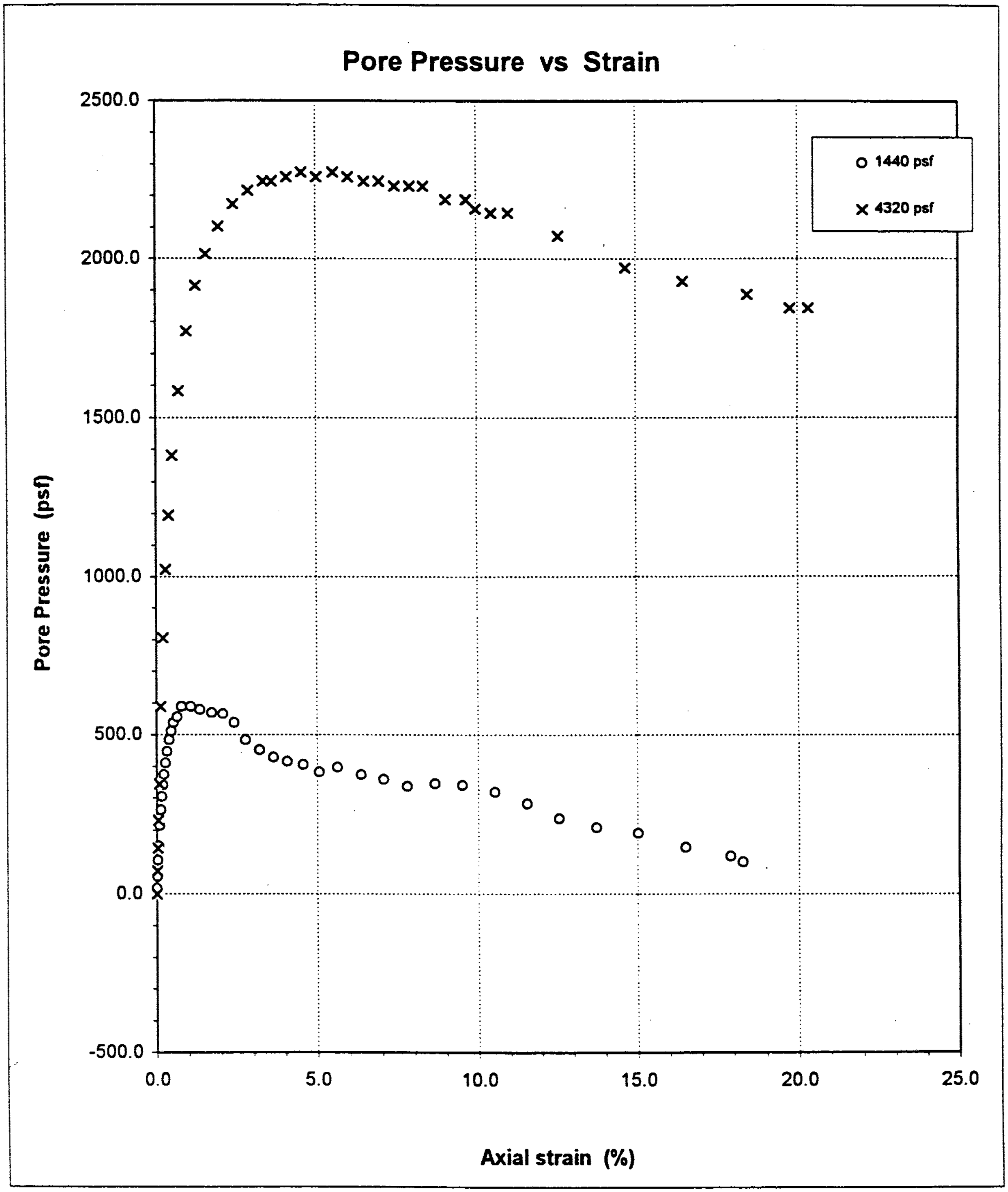
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 2
SAMPLE NUMBER: S - 2
DEPTH (ft.): 12 - 14
SOIL TYPE: (CL) Brown w/ some gray clay, tr. f. gravel



TXCUPP

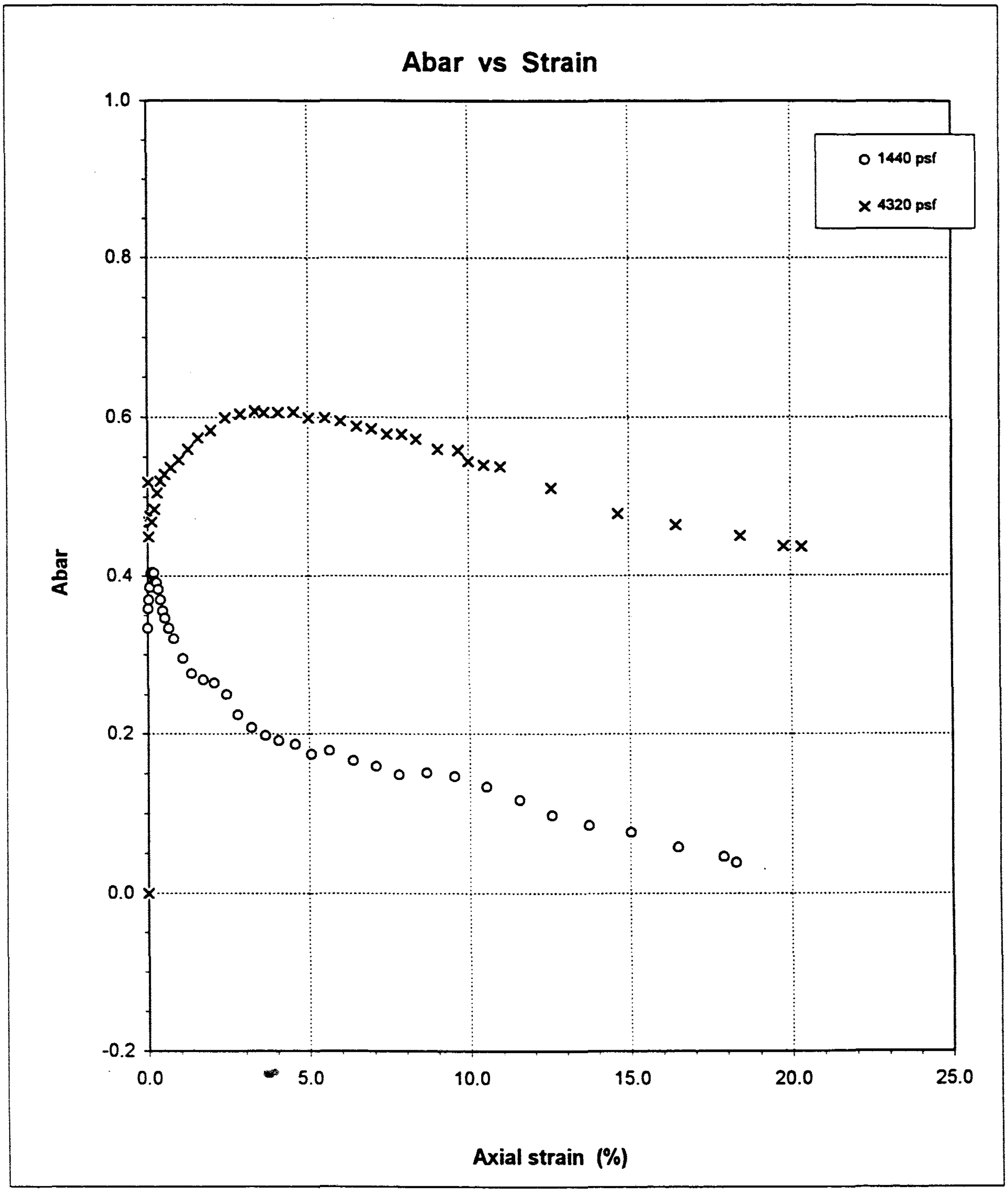
CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 2
SAMPLE NUMBER: S - 2
DEPTH (ft.): 12 - 14
SOIL TYPE: (CL) Brown w/ some gray clay, tr. f. gravel



Signet Testing labs, Inc. 12/21/98 Page ______ of ______

TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 2
SAMPLE NUMBER: S - 2
DEPTH (ft.): 12 - 14
SOIL TYPE: (CL) Brown w/ some gray clay, tr. f. gravel



TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 2
SAMPLE NUMBER: S - 2
DEPTH (ft.): 12 - 14
SOIL TYPE: (CL) Brown w/ some gray clay, tr. f. gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	1331.8	1347.4	
HEIGHT(in.) =	5.990	5.960	
AREA(sq.in.) =	6.544	6.525	
VOLUME(c.c.) =	642.37	637.27	
WET DENSITY (Pcf) =	129.4	131.9	
DRY DENSITY (Pcf) =	109.0	109.9	
MOISTURE (%) =	18.7	20.1	
Gs (Assumed) =	2.70		
VOID RATIO =	0.546	0.533	
% SATURATION =	92.5	101.6	

DATA REDUCTIONS:

LOAD FACTOR = 0.1238589
DISPL. FACTOR = 0.0002997
P.W.P. FACTOR = 0.0
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 1440 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	1440.0	1440.0	1.00	1440.0	0.0	0.00
0.01	54.7	18.3	1421.7	1476.4	1.04	1449.1	27.3	0.33
0.02	153.0	54.8	1385.2	1538.2	1.11	1461.7	76.5	0.36
0.04	284.2	105.0	1335.0	1619.1	1.21	1477.1	142.1	0.37
0.06	390.6	150.7	1289.3	1680.0	1.30	1484.6	195.3	0.39
0.10	532.5	214.6	1225.4	1757.9	1.43	1491.6	266.3	0.40
0.13	655.2	264.9	1175.1	1830.4	1.56	1502.8	327.6	0.40
0.16	756.0	306.0	1134.0	1890.0	1.67	1512.0	378.0	0.40
0.20	848.4	342.5	1097.5	1946.0	1.77	1521.7	424.2	0.40
0.24	951.7	374.4	1065.6	2017.3	1.89	1541.4	475.9	0.39
0.28	1049.5	411.0	1029.0	2078.5	2.02	1553.8	524.7	0.39
0.33	1168.8	447.5	992.5	2161.3	2.18	1576.9	584.4	0.38
0.40	1309.6	484.0	956.0	2265.5	2.37	1610.7	654.8	0.37
0.47	1439.2	511.4	928.6	2367.8	2.55	1648.2	719.6	0.36
0.54	1555.1	538.8	901.2	2456.3	2.73	1678.7	777.6	0.35
0.65	1670.1	557.1	882.9	2553.0	2.89	1717.9	835.0	0.33
0.79	1838.7	589.1	850.9	2689.6	3.16	1770.3	919.3	0.32
1.07	1995.7	589.1	850.9	2846.6	3.35	1848.8	997.8	0.30
1.35	2097.9	579.9	860.1	2957.9	3.44	1909.0	1048.9	0.28
1.71	2125.2	570.8	869.2	2994.4	3.45	1931.8	1062.6	0.27
2.06	2144.4	566.2	873.8	3018.1	3.45	1945.9	1072.2	0.26
2.42	2157.9	538.8	901.2	3059.0	3.39	1980.1	1078.9	0.25
2.77	2160.7	484.0	956.0	3116.7	3.26	2036.3	1080.4	0.22
3.20	2172.4	452.1	987.9	3160.3	3.20	2074.1	1086.2	0.21
3.63	2168.0	429.2	1010.8	3178.7	3.14	2094.7	1084.0	0.20
4.06	2168.8	415.5	1024.5	3193.3	3.12	2108.9	1084.4	0.19
4.56	2173.1	406.4	1033.6	3206.7	3.10	2120.2	1086.6	0.19
5.06	2198.1	383.6	1056.4	3254.5	3.08	2155.5	1099.1	0.17
5.63	2215.8	397.3	1042.7	3258.5	3.13	2150.6	1107.9	0.18
6.35	2250.1	374.4	1065.6	3315.7	3.11	2190.6	1125.1	0.17
7.07	2268.5	360.7	1079.3	3347.8	3.10	2213.5	1134.3	0.16
7.79	2271.0	337.9	1102.1	3373.1	3.06	2237.6	1135.5	0.15
8.65	2289.8	347.0	1093.0	3382.7	3.10	2237.8	1144.9	0.15
9.51	2332.6	342.5	1097.5	3430.1	3.13	2263.8	1166.3	0.15
10.51	2394.7	319.6	1120.4	3515.0	3.14	2317.7	1197.3	0.13
11.54	2420.4	283.1	1156.9	3577.3	3.09	2367.1	1210.2	0.12
12.56	2428.5	237.5	1202.5	3631.0	3.02	2416.8	1214.2	0.10
13.71	2464.8	210.1	1229.9	3694.7	3.00	2462.3	1232.4	0.09
15.02	2511.0	191.8	1248.2	3759.3	3.01	2503.7	1255.5	0.08
16.49	2527.0	146.1	1293.9	3820.9	2.95	2557.4	1263.5	0.06
17.90	2563.0	118.7	1321.3	3884.2	2.94	2602.8	1281.5	0.05
18.28	2571.0	100.5	1339.5	3910.5	2.92	2625.0	1285.5	0.04

TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 2
SAMPLE NUMBER: S - 2
DEPTH (ft.): 12 - 14
SOIL TYPE: (CL) Brown w/ some gray clay, tr. f. gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	1364.7	1358.0	
HEIGHT(in.) =	5.980	5.920	
AREA(sq.in.) =	6.540	6.434	
VOLUME(c.c.) =	640.85	624.15	
WET DENSITY (Pcf) =	132.9	135.8	
DRY DENSITY (Pcf) =	112.7	115.8	
MOISTURE (%) =	17.9	17.3	
Gs (Assumed) =	2.70		
VOID RATIO =	0.494	0.455	
% SATURATION =	97.6	102.5	

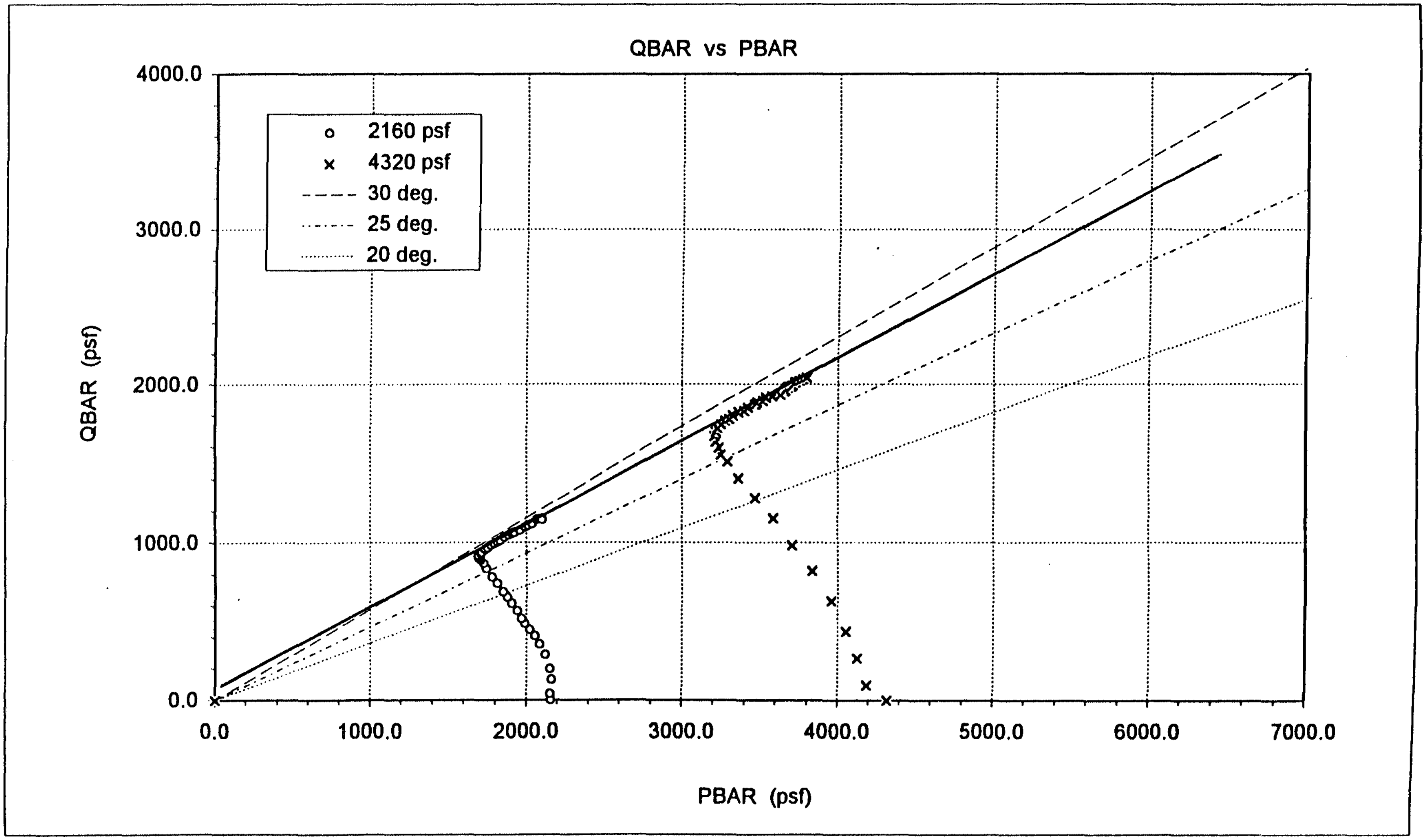
DATA REDUCTIONS:

LOAD FACTOR = 9.55
DISPL. FACTOR = 0.001
P.W.P. FACTOR = 1.0
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 4320 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	4320.0	4320.0	1.00	4320.0	0.0	0.00
0.02	138.9	72.0	4248.0	4386.9	1.03	4317.5	69.5	0.52
0.03	320.5	144.0	4176.0	4496.5	1.08	4336.3	160.3	0.45
0.05	491.4	230.4	4089.6	4581.0	1.12	4335.3	245.7	0.47
0.08	726.2	345.6	3974.4	4700.6	1.18	4337.5	363.1	0.48
0.14	1259.4	590.4	3729.6	4989.0	1.34	4359.3	629.7	0.47
0.21	1663.7	806.4	3513.6	5177.3	1.47	4345.4	831.8	0.48
0.30	2024.4	1022.4	3297.6	5322.0	1.61	4309.8	1012.2	0.51
0.40	2299.3	1195.2	3124.8	5424.1	1.74	4274.4	1149.6	0.52
0.52	2615.3	1382.4	2937.6	5552.9	1.89	4245.3	1307.7	0.53
0.71	2950.0	1584.0	2736.0	5686.0	2.08	4211.0	1475.0	0.54
0.96	3238.8	1771.2	2548.8	5787.6	2.27	4168.2	1619.4	0.55
1.25	3419.4	1915.2	2404.8	5824.2	2.42	4114.5	1709.7	0.56
1.56	3513.8	2016.0	2304.0	5817.8	2.53	4060.9	1756.9	0.57
1.96	3604.4	2102.4	2217.6	5822.0	2.63	4019.8	1802.2	0.58
2.42	3629.0	2174.4	2145.6	5774.6	2.69	3960.1	1814.5	0.60
2.89	3674.0	2217.6	2102.4	5776.4	2.75	3939.4	1837.0	0.60
3.36	3697.4	2246.4	2073.6	5771.0	2.78	3922.3	1848.7	0.61
3.63	3707.7	2246.4	2073.6	5781.3	2.79	3927.4	1853.8	0.61
4.09	3731.1	2260.8	2059.2	5790.3	2.81	3924.8	1865.6	0.61
4.56	3753.5	2275.2	2044.8	5798.3	2.84	3921.6	1876.8	0.61
5.03	3775.5	2260.8	2059.2	5834.7	2.83	3947.0	1887.8	0.60
5.54	3795.8	2275.2	2044.8	5840.6	2.86	3942.7	1897.9	0.60
6.01	3796.9	2260.8	2059.2	5856.1	2.84	3957.6	1898.4	0.60
6.51	3816.7	2246.4	2073.6	5890.3	2.84	3981.9	1908.3	0.59
6.98	3837.5	2246.4	2073.6	5911.1	2.85	3992.3	1918.7	0.59
7.45	3857.6	2232.0	2088.0	5945.6	2.85	4016.8	1928.8	0.58
7.92	3857.5	2232.0	2088.0	5945.5	2.85	4016.8	1928.8	0.58
8.36	3897.9	2232.0	2088.0	5985.9	2.87	4036.9	1948.9	0.57
9.05	3907.3	2188.8	2131.2	6038.5	2.83	4084.9	1953.7	0.56
9.68	3919.1	2188.8	2131.2	6050.3	2.84	4090.7	1959.5	0.56
9.99	3963.2	2160.0	2160.0	6123.2	2.83	4141.6	1981.6	0.55
10.47	3970.7	2145.6	2174.4	6145.1	2.83	4159.8	1985.4	0.54
11.00	3985.5	2145.6	2174.4	6159.9	2.83	4167.2	1992.8	0.54
12.58	4054.6	2073.6	2246.4	6301.0	2.80	4273.7	2027.3	0.51
14.68	4121.6	1972.8	2347.2	6468.8	2.76	4408.0	2060.8	0.48
16.47	4160.0	1929.6	2390.4	6550.4	2.74	4470.4	2080.0	0.46
18.46	4191.5	1886.4	2433.6	6625.1	2.72	4529.3	2095.7	0.45
19.78	4218.1	1843.2	2476.8	6694.9	2.70	4585.8	2109.0	0.44
20.34	4222.8	1843.2	2476.8	6699.6	2.70	4588.2	2111.4	0.44

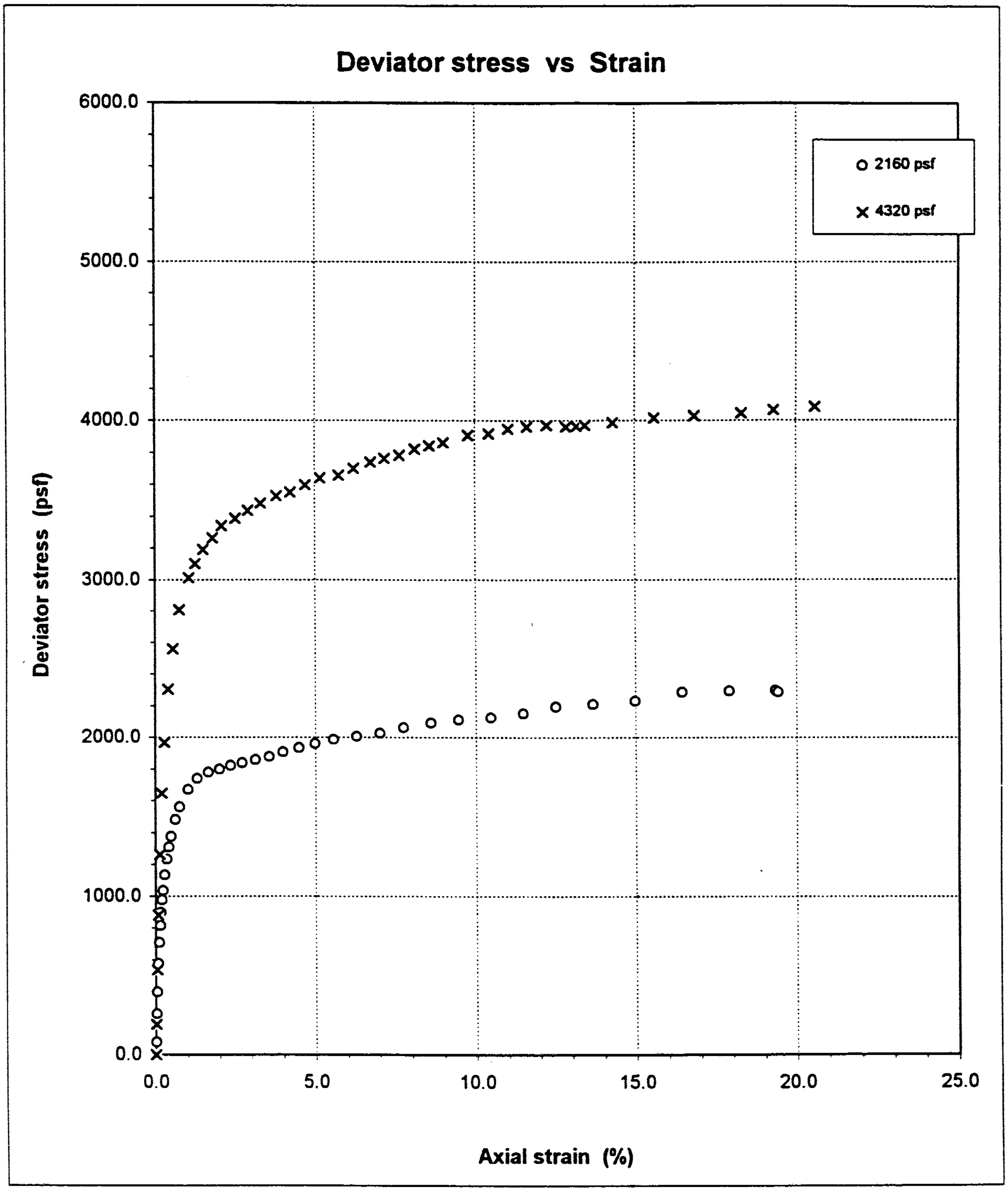
CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 4
SAMPLE NUMBER: S - 2
DEPTH (ft.): 16 - 18
SOIL TYPE: (SC) Brown clayey sand w/ gravel

c = 60 psf
ϕ' = 33.1 deg.



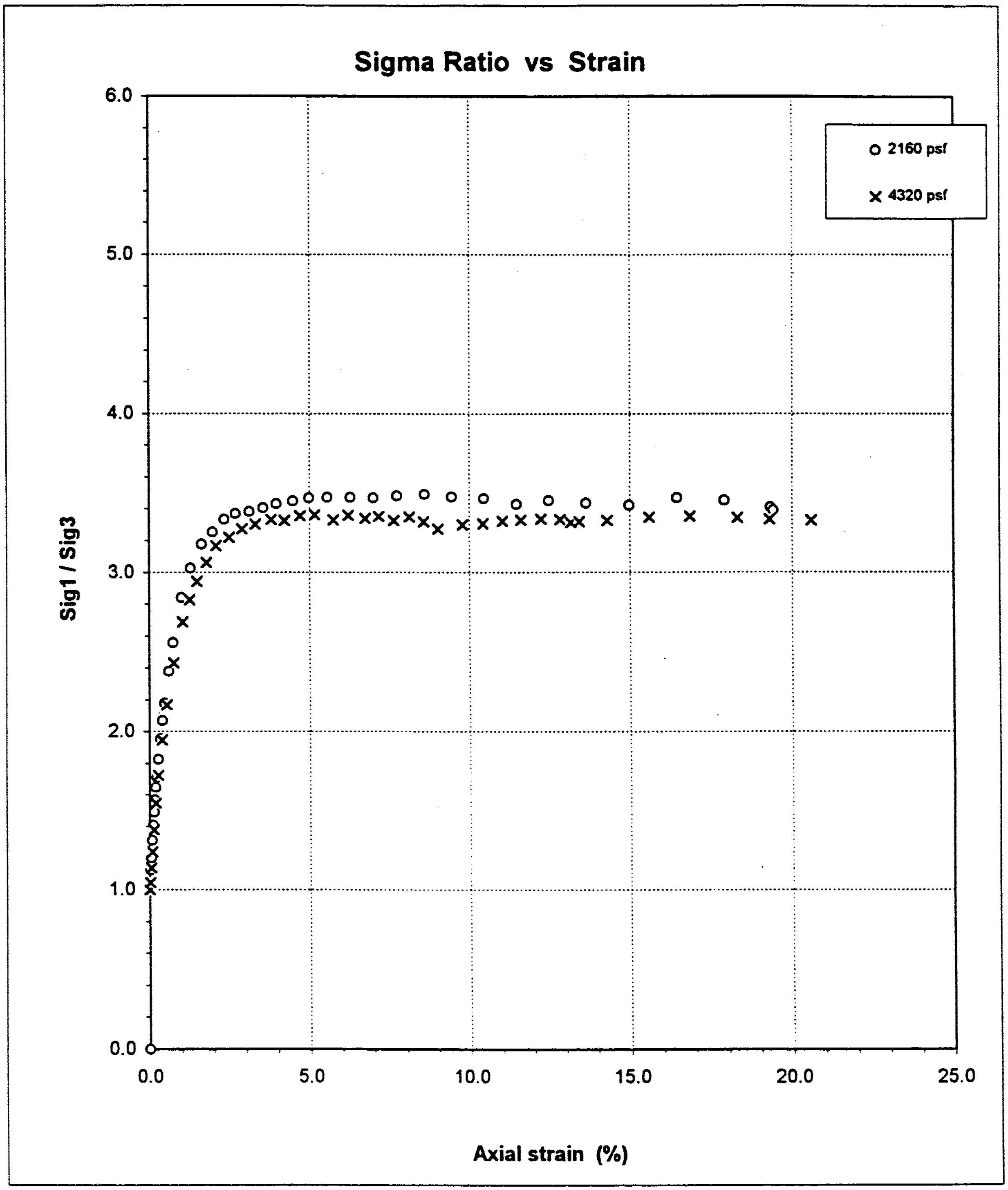
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 4
SAMPLE NUMBER: S - 2
DEPTH (ft.): 16 - 18
SOIL TYPE: (SC) Brown clayey sand w/ gravel



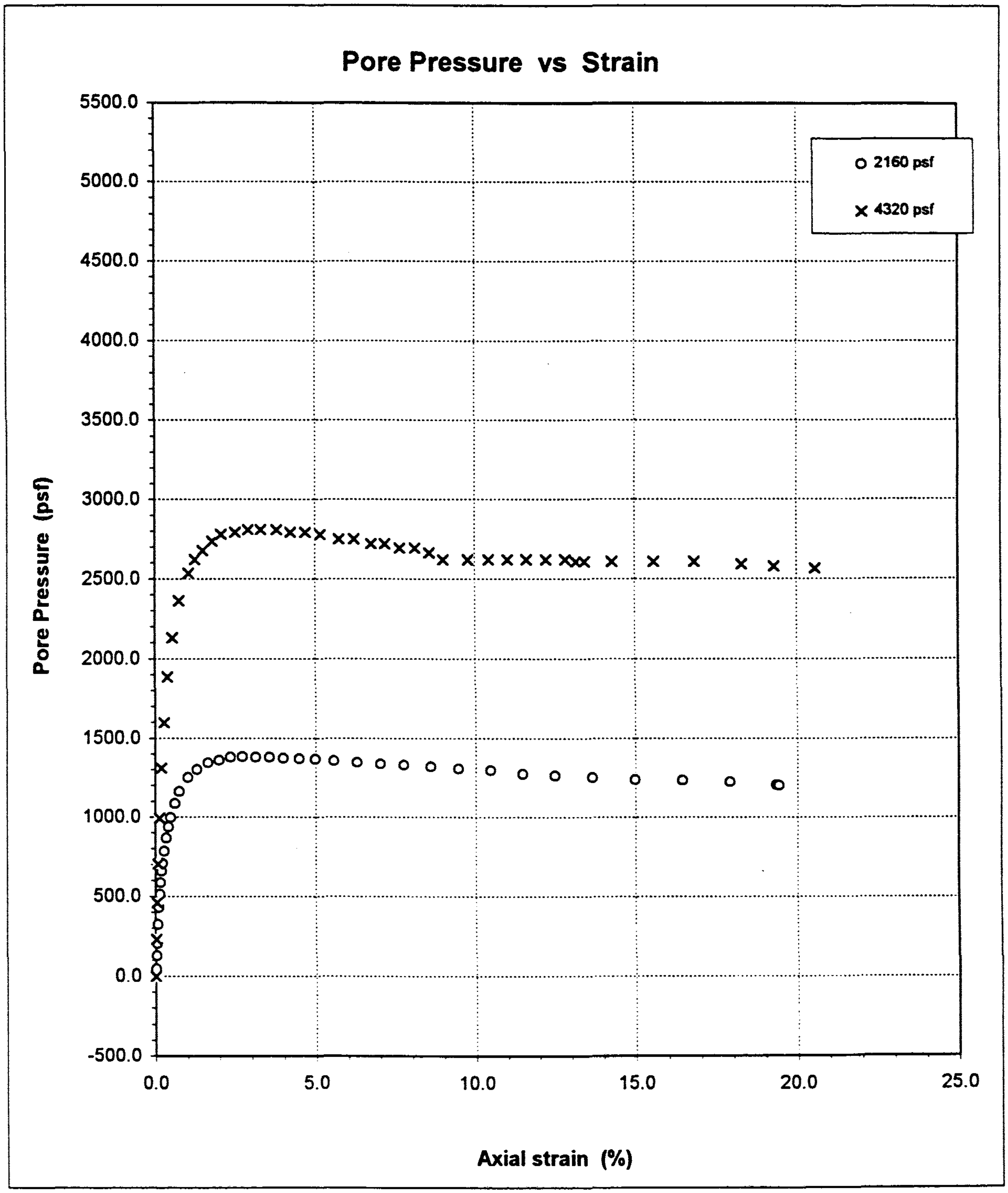
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 4
SAMPLE NUMBER: S - 2
DEPTH (ft.): 16 - 18
SOIL TYPE: (SC) Brown clayey sand w/ gravel



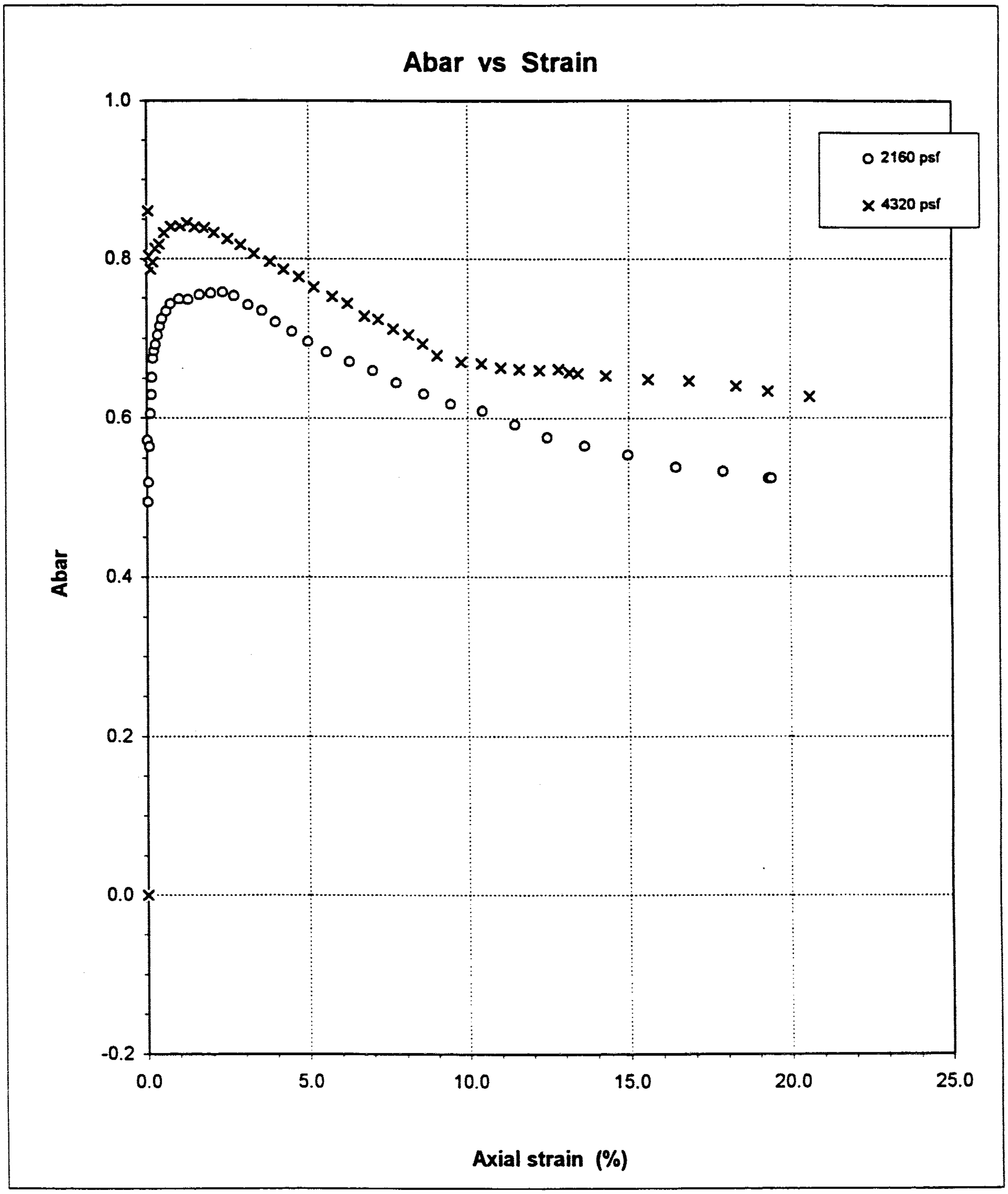
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 4
SAMPLE NUMBER: S - 2
DEPTH (ft.): 16 - 18
SOIL TYPE: (SC) Brown clayey sand w/ gravel



TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 4
SAMPLE NUMBER: S - 2
DEPTH (ft.): 16 - 18
SOIL TYPE: (SC) Brown clayey sand w/ gravel



TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 4
SAMPLE NUMBER: S - 2
DEPTH (ft.): 16 - 18
SOIL TYPE: (SC) Brown clayey sand w/ gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	1377.3	1373.3	
HEIGHT(in.) =	6.000	5.932	
AREA(sq.in.) =	6.522	6.487	
VOLUME(c.c.) =	641.21	630.61	
WET DENSITY (Pcf) =	134.0	135.9	
DRY DENSITY (Pcf) =	114.6	116.5	
MOISTURE (%) =	17.0	16.6	
Gs (Assumed) =	2.70		
VOID RATIO =	0.470	0.446	
% SATURATION =	97.5	100.7	

DATA REDUCTIONS:

LOAD FACTOR = 0.1238589
DISPL. FACTOR = 0.0002997
P.W.P. FACTOR = 0.031711
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 2160 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	2160.0	2160.0	1.00	2160.0	0.0	0.00
0.01	79.7	45.7	2114.3	2194.1	1.04	2154.2	39.9	0.57
0.03	258.4	127.9	2032.1	2290.5	1.13	2161.3	129.2	0.49
0.05	395.7	205.5	1954.5	2350.2	1.20	2152.4	197.9	0.52
0.08	574.1	324.2	1835.8	2409.9	1.31	2122.9	287.1	0.56
0.11	708.5	429.2	1730.8	2439.3	1.41	2085.0	354.3	0.61
0.14	812.7	511.4	1648.6	2461.2	1.49	2054.9	406.3	0.63
0.17	897.5	584.5	1575.5	2473.0	1.57	2024.2	448.7	0.65
0.20	974.0	657.6	1502.4	2476.5	1.65	1989.5	487.0	0.68
0.23	1034.1	707.8	1452.2	2486.3	1.71	1969.2	517.0	0.68
0.28	1135.0	785.4	1374.6	2509.6	1.83	1942.1	567.5	0.69
0.35	1232.9	867.6	1292.4	2525.3	1.95	1908.8	616.4	0.70
0.41	1308.7	936.1	1223.9	2532.6	2.07	1878.3	654.4	0.72
0.47	1373.6	995.5	1164.5	2538.1	2.18	1851.3	686.8	0.72
0.61	1481.0	1086.8	1073.2	2554.2	2.38	1813.7	740.5	0.73
0.74	1560.9	1159.9	1000.1	2561.1	2.56	1780.6	780.5	0.74
1.02	1670.9	1251.2	908.8	2579.7	2.84	1744.3	835.5	0.75
1.29	1739.5	1301.4	858.6	2598.1	3.03	1728.3	869.8	0.75
1.64	1779.4	1342.5	817.5	2596.8	3.18	1707.1	889.7	0.75
2.00	1799.9	1360.8	799.2	2599.1	3.25	1699.2	900.0	0.76
2.35	1820.3	1379.1	780.9	2601.2	3.33	1691.1	910.1	0.76
2.71	1837.6	1383.6	776.4	2614.0	3.37	1695.2	918.8	0.75
3.13	1858.9	1379.1	780.9	2639.9	3.38	1710.4	929.5	0.74
3.56	1877.2	1379.1	780.9	2658.1	3.40	1719.5	938.6	0.73
3.99	1908.5	1374.5	785.5	2694.0	3.43	1739.8	954.3	0.72
4.49	1932.6	1369.9	790.1	2722.7	3.45	1756.4	966.3	0.71
4.99	1961.8	1365.4	794.6	2756.4	3.47	1775.5	980.9	0.70
5.57	1986.1	1356.2	803.8	2789.9	3.47	1796.8	993.1	0.68
6.29	2007.0	1347.1	812.9	2819.9	3.47	1816.4	1003.5	0.67
7.01	2027.3	1338.0	822.0	2849.4	3.47	1835.7	1013.7	0.66
7.74	2062.2	1328.8	831.2	2893.4	3.48	1862.3	1031.1	0.64
8.60	2093.3	1319.7	840.3	2933.6	3.49	1886.9	1046.6	0.63
9.46	2113.4	1306.0	854.0	2967.4	3.47	1910.7	1056.7	0.62
10.47	2126.8	1296.9	863.1	2989.9	3.46	1926.5	1063.4	0.61
11.48	2151.3	1274.0	886.0	3037.3	3.43	1961.6	1075.7	0.59
12.49	2194.1	1264.9	895.1	3089.2	3.45	1992.2	1097.1	0.58
13.67	2212.2	1251.2	908.8	3121.0	3.43	2014.9	1106.1	0.57
14.99	2232.2	1237.5	922.5	3154.7	3.42	2038.6	1116.1	0.55
16.45	2288.0	1232.9	927.1	3215.1	3.47	2071.1	1144.0	0.54
17.91	2295.3	1223.8	936.2	3231.5	3.45	2083.8	1147.6	0.53
19.33	2297.7	1205.5	954.5	3252.2	3.41	2103.3	1148.9	0.52
19.42	2288.6	1201.0	959.0	3247.7	3.39	2103.4	1144.3	0.52

TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 4
SAMPLE NUMBER: S - 2
DEPTH (ft.): 16 - 18
SOIL TYPE: (SC) Brown clayey sand w/ gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	1407.8	1393.5	
HEIGHT(in.) =	6.000	5.951	
AREA(sq.in.) =	6.522	6.415	
VOLUME(c.c.) =	641.21	625.61	
WET DENSITY (Pcf) =	137.0	139.0	
DRY DENSITY (Pcf) =	118.2	121.2	
MOISTURE (%) =	15.9	14.7	
Gs (Assumed) =	2.70		
VOID RATIO =	0.425	0.391	
% SATURATION =	100.9	101.8	

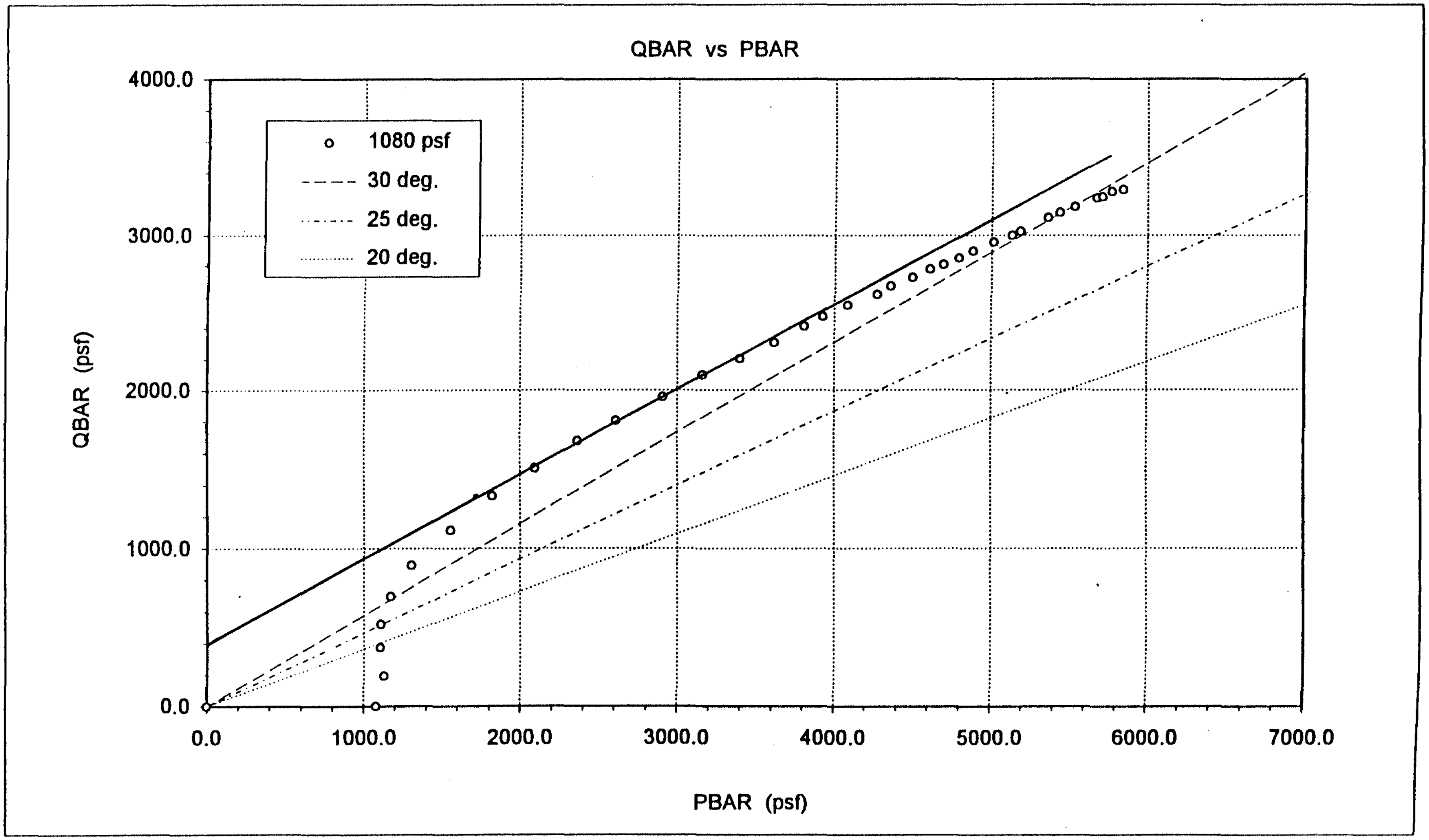
DATA REDUCTIONS:

LOAD FACTOR = 9.55
DISPL. FACTOR = 0.001
P.W.P. FACTOR = 1.0
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 4320 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	4320.0	4320.0	1.00	4320.0	0.0	0.00
0.02	192.9	230.4	4089.6	4282.5	1.05	4186.0	96.4	1.19
0.05	535.6	460.8	3859.2	4394.8	1.14	4127.0	267.8	0.86
0.08	878.2	705.6	3614.4	4492.6	1.24	4053.5	439.1	0.80
0.13	1263.0	993.6	3326.4	4589.4	1.38	3957.9	631.5	0.79
0.20	1647.3	1310.4	3009.6	4656.9	1.55	3833.2	823.6	0.80
0.29	1966.5	1598.4	2721.6	4688.1	1.72	3704.9	983.3	0.81
0.40	2305.8	1886.4	2433.6	4739.4	1.95	3586.5	1152.9	0.82
0.55	2558.1	2131.2	2188.8	4746.9	2.17	3467.8	1279.0	0.83
0.76	2808.2	2361.6	1958.4	4766.6	2.43	3362.5	1404.1	0.84
1.04	3012.2	2534.4	1785.6	4797.8	2.69	3291.7	1506.1	0.84
1.25	3101.1	2620.8	1699.2	4800.3	2.83	3249.8	1550.6	0.85
1.50	3188.5	2678.4	1641.6	4830.1	2.94	3235.8	1594.2	0.84
1.80	3262.9	2736.0	1584.0	4846.9	3.06	3215.4	1631.4	0.84
2.08	3337.4	2779.2	1540.8	4878.2	3.17	3209.5	1668.7	0.83
2.50	3385.7	2793.6	1526.4	4912.1	3.22	3219.3	1692.9	0.83
2.91	3434.2	2808.0	1512.0	4946.2	3.27	3229.1	1717.1	0.82
3.31	3482.1	2808.0	1512.0	4994.1	3.30	3253.0	1741.0	0.81
3.81	3525.8	2808.0	1512.0	5037.8	3.33	3274.9	1762.9	0.80
4.23	3551.4	2793.6	1526.4	5077.8	3.33	3302.1	1775.7	0.79
4.71	3595.3	2793.6	1526.4	5121.7	3.36	3324.0	1797.6	0.78
5.18	3638.5	2779.2	1540.8	5179.3	3.36	3360.1	1819.3	0.76
5.75	3657.0	2750.4	1569.6	5226.6	3.33	3398.1	1828.5	0.75
6.22	3699.0	2750.4	1569.6	5268.6	3.36	3419.1	1849.5	0.74
6.75	3738.1	2721.6	1598.4	5336.5	3.34	3467.5	1869.1	0.73
7.18	3760.4	2721.6	1598.4	5358.8	3.35	3478.6	1880.2	0.72
7.65	3781.3	2692.8	1627.2	5408.5	3.32	3517.8	1890.6	0.71
8.12	3820.8	2692.8	1627.2	5448.0	3.35	3537.6	1910.4	0.70
8.57	3841.4	2664.0	1656.0	5497.4	3.32	3576.7	1920.7	0.69
9.02	3861.7	2620.8	1699.2	5560.9	3.27	3630.1	1930.9	0.68
9.79	3906.3	2620.8	1699.2	5605.5	3.30	3652.3	1953.1	0.67
10.44	3916.7	2620.8	1699.2	5615.9	3.31	3657.5	1958.3	0.67
11.04	3947.4	2620.8	1699.2	5646.6	3.32	3672.9	1973.7	0.66
11.63	3959.2	2620.8	1699.2	5658.4	3.33	3678.8	1979.6	0.66
12.25	3969.0	2620.8	1699.2	5668.2	3.34	3683.7	1984.5	0.66
12.85	3960.3	2620.8	1699.2	5659.5	3.33	3679.4	1980.2	0.66
13.17	3964.4	2606.4	1713.6	5678.0	3.31	3695.8	1982.2	0.66
13.44	3970.7	2606.4	1713.6	5684.3	3.32	3698.9	1985.3	0.66
14.30	3986.5	2606.4	1713.6	5700.1	3.33	3706.8	1993.2	0.65
15.59	4016.8	2606.4	1713.6	5730.4	3.34	3722.0	2008.4	0.65
16.84	4028.9	2606.4	1713.6	5742.5	3.35	3728.0	2014.4	0.65
18.30	4045.6	2592.0	1728.0	5773.6	3.34	3750.8	2022.8	0.64
19.29	4065.7	2577.6	1742.4	5808.1	3.33	3775.3	2032.9	0.63
20.58	4085.7	2563.2	1756.8	5842.5	3.33	3799.6	2042.8	0.63

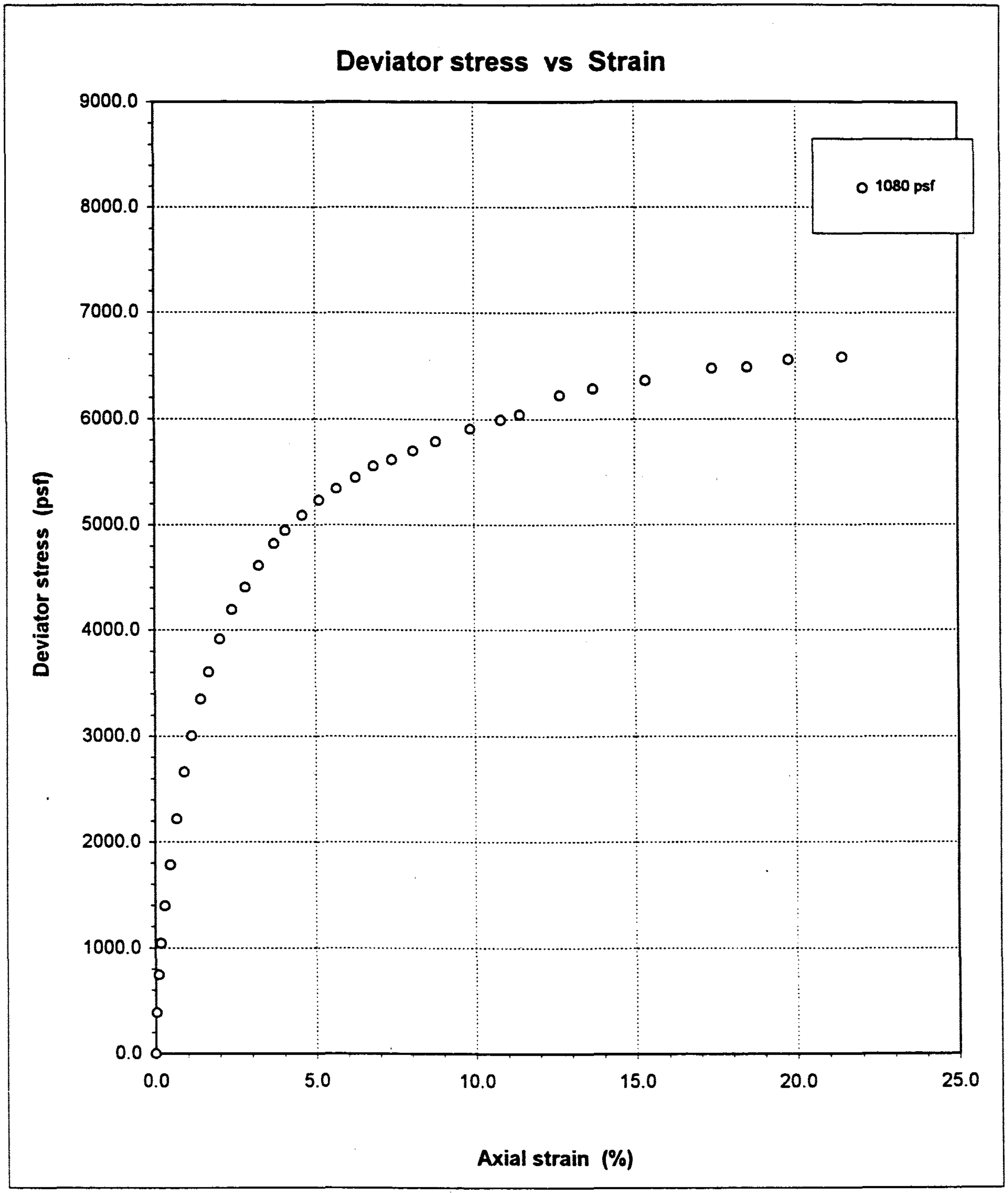
CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 6
SAMPLE NUMBER: L 1b
DEPTH (ft.): 6-6.5
SOIL TYPE: (CL) Brown sandy clay, tr. f. gravel

Dessicated Crust: Undrained shear strength may be unrealistically high
c = 473 psf
ϕ' = 32.2 deg.



TXCUPP

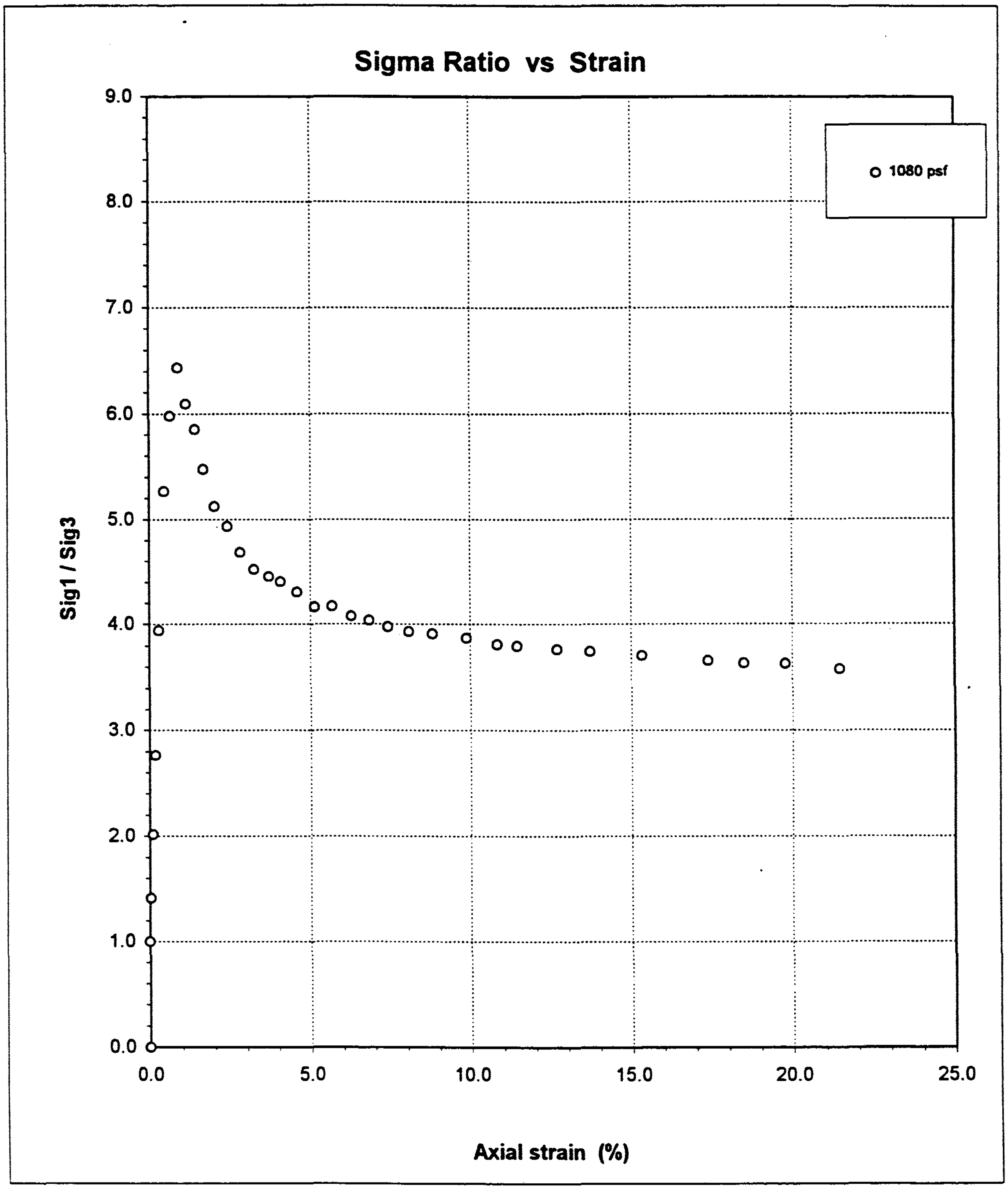
CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 6
SAMPLE NUMBER: L 1b
DEPTH (ft.): 6-6.5
SOIL TYPE: (CL) Brown sandy clay, tr. f. gravel



Signet Testing labs, Inc.   12/21/98   Page ______ of ______

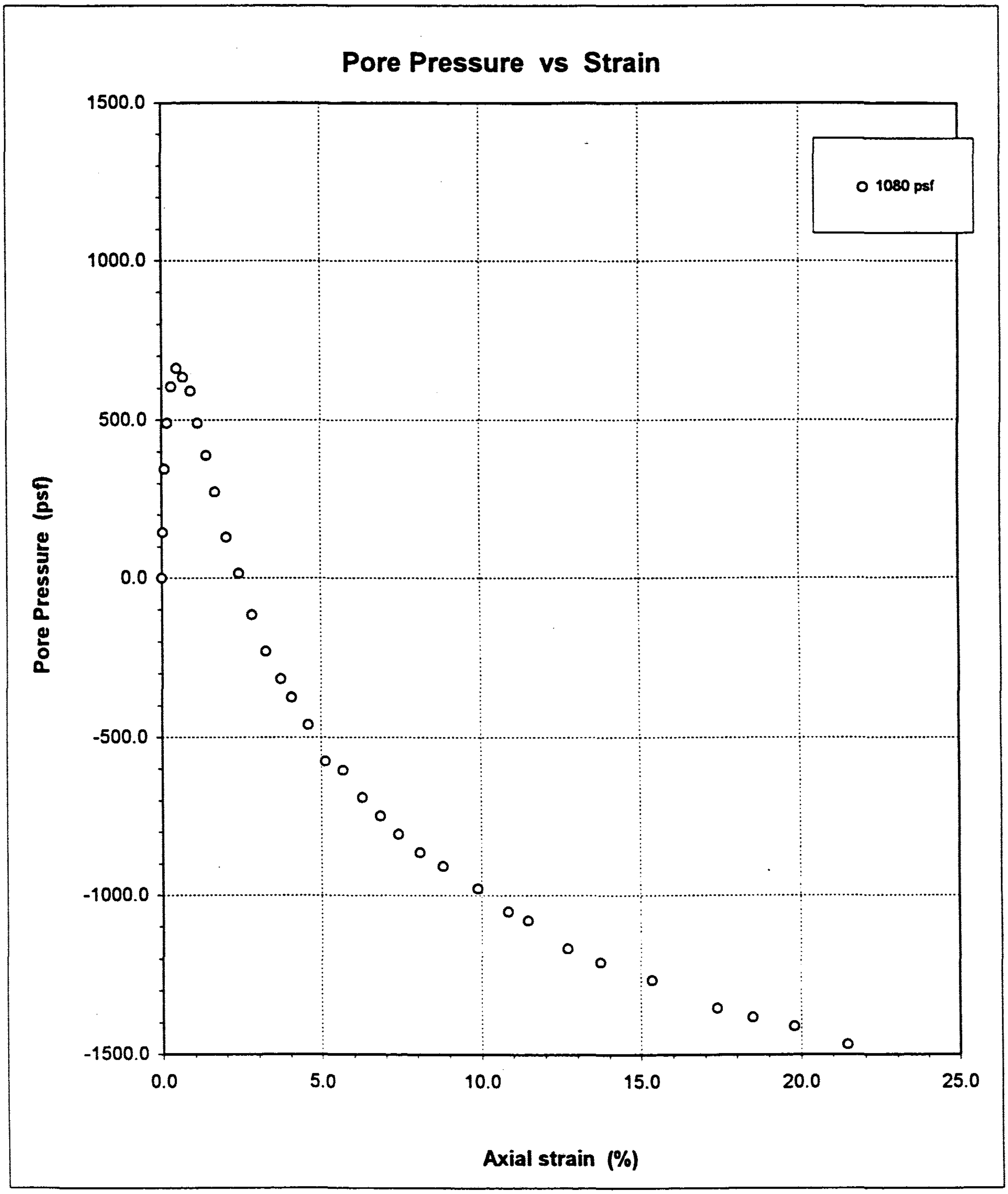
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 6
SAMPLE NUMBER: L 1b
DEPTH (ft.): 6-6.5
SOIL TYPE: (CL) Brown sandy clay, tr. f. gravel



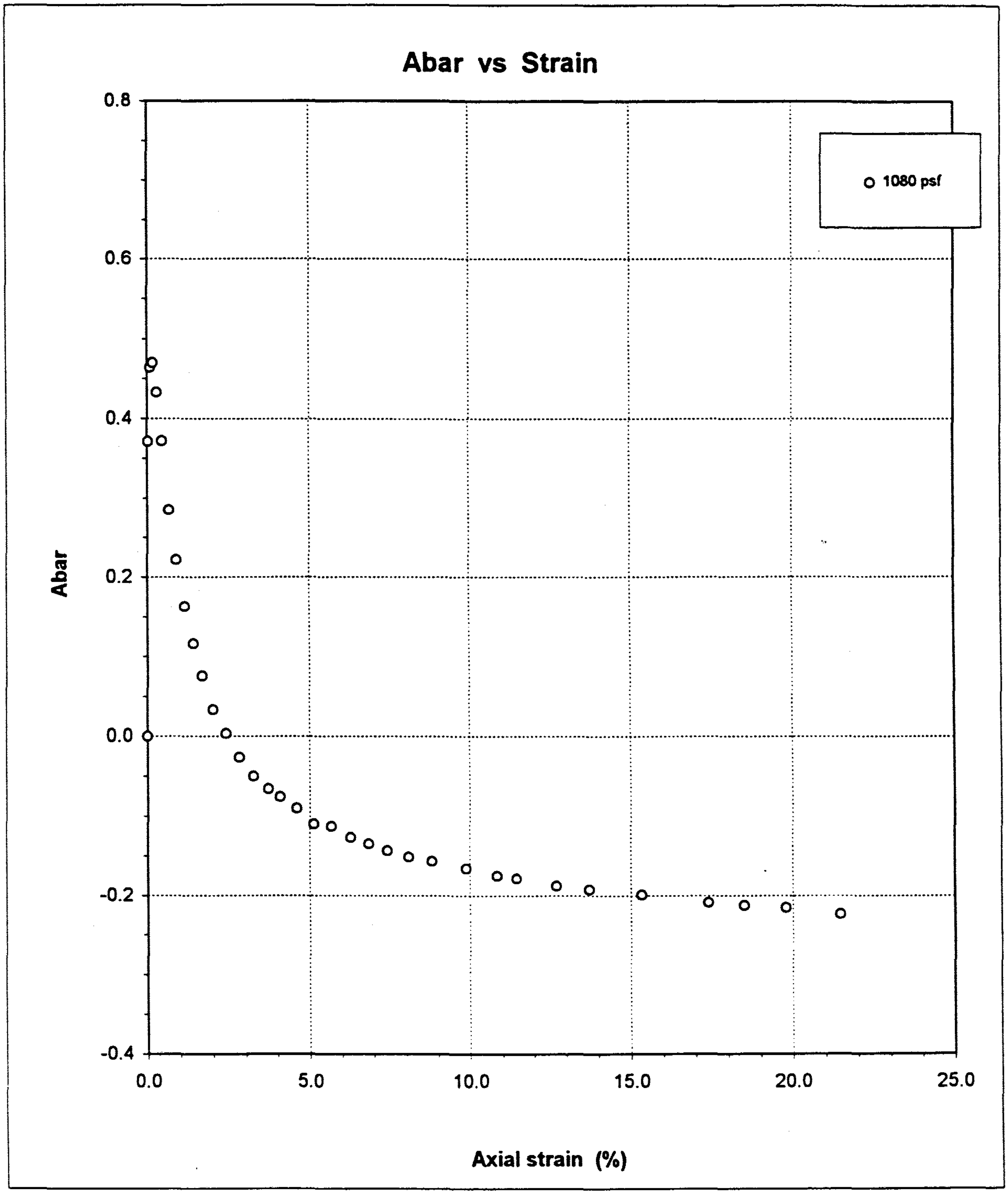
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 6
SAMPLE NUMBER: L 1b
DEPTH (ft.): 6-6.5
SOIL TYPE: (CL) Brown sandy clay, tr. f. gravel



TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 6
SAMPLE NUMBER: L 1b
DEPTH (ft.): 6-6.5
SOIL TYPE: (CL) Brown sandy clay, tr. f. gravel



TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 6
SAMPLE NUMBER: L 1b
DEPTH (ft.): 6-6.5
SOIL TYPE: (CL) Brown sandy clay, tr. f. gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	914.0	925.2	
HEIGHT(in.) =	5.420	5.407	
AREA(sq.in.) =	4.617	4.611	
VOLUME(c.c.) =	410.04	408.54	
WET DENSITY (Pcf) =	139.1	141.3	
DRY DENSITY (Pcf) =	123.3	123.8	
MOISTURE (%) =	12.8	14.1	
Gs (Assumed) =	2.70		
VOID RATIO =	0.366	0.361	
% SATURATION =	94.2	105.8	

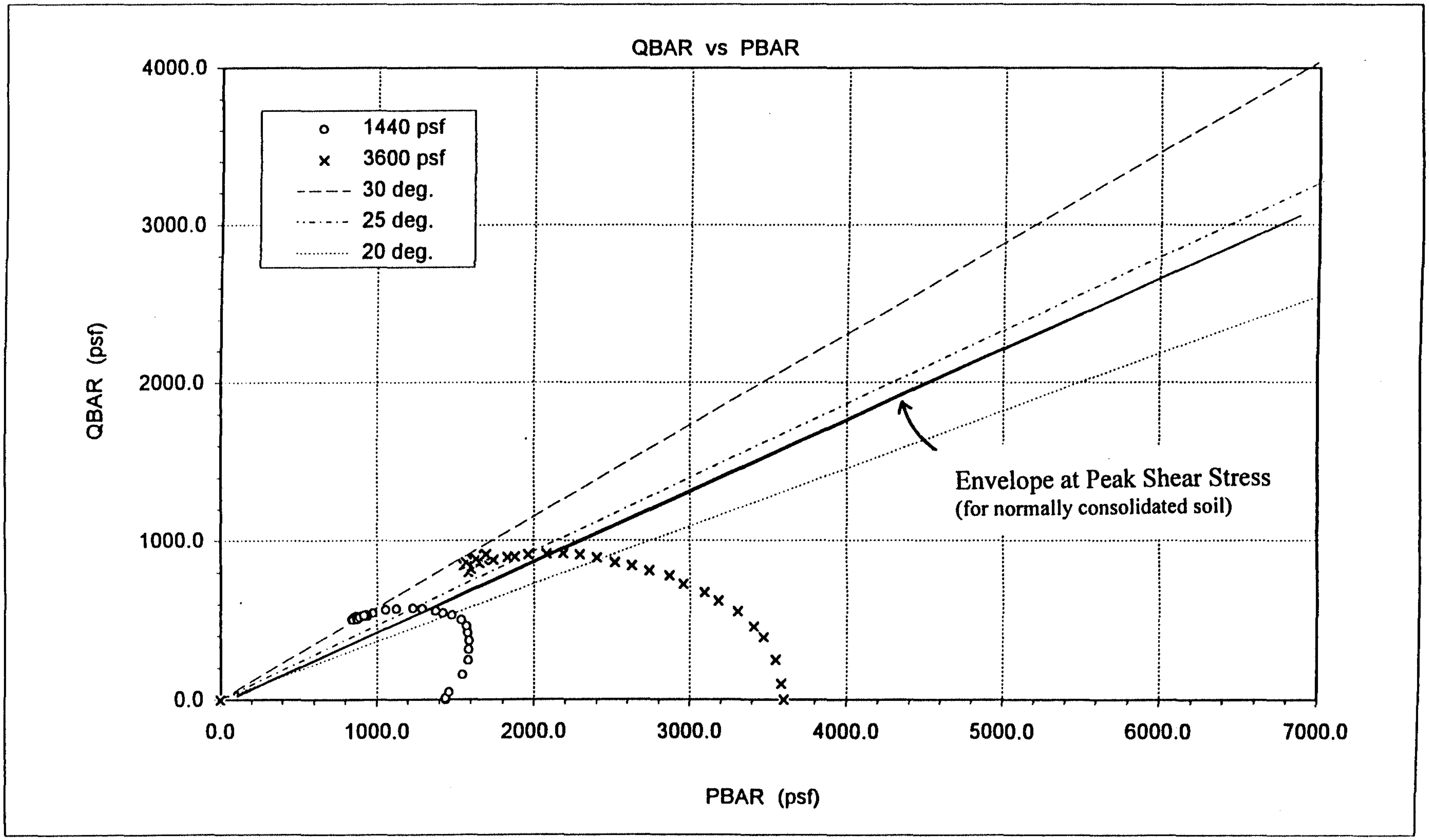
DATA REDUCTIONS:

LOAD FACTOR = 9.55
DISPL. FACTOR = 0.001
P.W.P. FACTOR = 1.0
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 1080 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	1080.0	1080.0	1.00	1080.0	0.0	0.00
0.04	387.5	144.0	936.0	1323.5	1.41	1129.8	193.8	0.37
0.09	744.9	345.6	734.4	1479.3	2.01	1106.8	372.4	0.46
0.18	1041.9	489.6	590.4	1632.3	2.76	1111.4	521.0	0.47
0.31	1397.4	604.8	475.2	1872.6	3.94	1173.9	698.7	0.43
0.47	1780.9	662.4	417.6	2198.5	5.26	1308.1	890.5	0.37
0.67	2221.8	633.6	446.4	2668.2	5.98	1557.3	1110.9	0.29
0.90	2660.0	590.4	489.6	3149.6	6.43	1819.6	1330.0	0.22
1.14	3007.3	489.6	590.4	3597.7	6.09	2094.0	1503.6	0.16
1.41	3351.7	388.8	691.2	4042.9	5.85	2367.0	1675.8	0.12
1.67	3606.8	273.6	806.4	4413.2	5.47	2609.8	1803.4	0.08
2.03	3915.3	129.6	950.4	4865.7	5.12	2908.0	1957.6	0.03
2.41	4190.8	14.4	1065.6	5256.4	4.93	3161.0	2095.4	0.00
2.82	4405.2	-115.2	1195.2	5600.4	4.69	3397.8	2202.6	-0.03
3.25	4616.7	-230.4	1310.4	5927.1	4.52	3618.8	2308.4	-0.05
3.72	4823.9	-316.8	1396.8	6220.7	4.45	3808.8	2412.0	-0.07
4.08	4948.9	-374.4	1454.4	6403.3	4.40	3928.8	2474.4	-0.08
4.60	5092.9	-460.8	1540.8	6633.7	4.31	4087.2	2546.4	-0.09
5.13	5234.0	-576.0	1656.0	6890.0	4.16	4273.0	2617.0	-0.11
5.69	5344.0	-604.8	1684.8	7028.8	4.17	4356.8	2672.0	-0.11
6.28	5450.2	-691.2	1771.2	7221.4	4.08	4496.3	2725.1	-0.13
6.85	5555.8	-748.8	1828.8	7384.6	4.04	4606.7	2777.9	-0.13
7.43	5618.2	-806.4	1886.4	7504.6	3.98	4695.5	2809.1	-0.14
8.09	5701.1	-864.0	1944.0	7645.1	3.93	4794.6	2850.6	-0.15
8.81	5792.4	-907.2	1987.2	7779.6	3.91	4883.4	2896.2	-0.16
9.89	5912.3	-979.2	2059.2	7971.5	3.87	5015.4	2956.2	-0.17
10.85	5995.5	-1051.2	2131.2	8126.7	3.81	5128.9	2997.7	-0.18
11.46	6046.8	-1080.0	2160.0	8206.8	3.80	5183.4	3023.4	-0.18
12.70	6222.5	-1166.4	2246.4	8468.9	3.77	5357.7	3111.3	-0.19
13.73	6290.2	-1209.6	2289.6	8579.8	3.75	5434.7	3145.1	-0.19
15.34	6362.2	-1267.2	2347.2	8709.4	3.71	5528.3	3181.1	-0.20
17.40	6478.9	-1353.6	2433.6	8912.5	3.66	5673.1	3239.5	-0.21
18.51	6489.1	-1382.4	2462.4	8951.5	3.64	5706.9	3244.5	-0.21
19.78	6554.9	-1411.2	2491.2	9046.1	3.63	5768.7	3277.5	-0.22
21.45	6582.9	-1468.8	2548.8	9131.7	3.58	5840.2	3291.4	-0.22

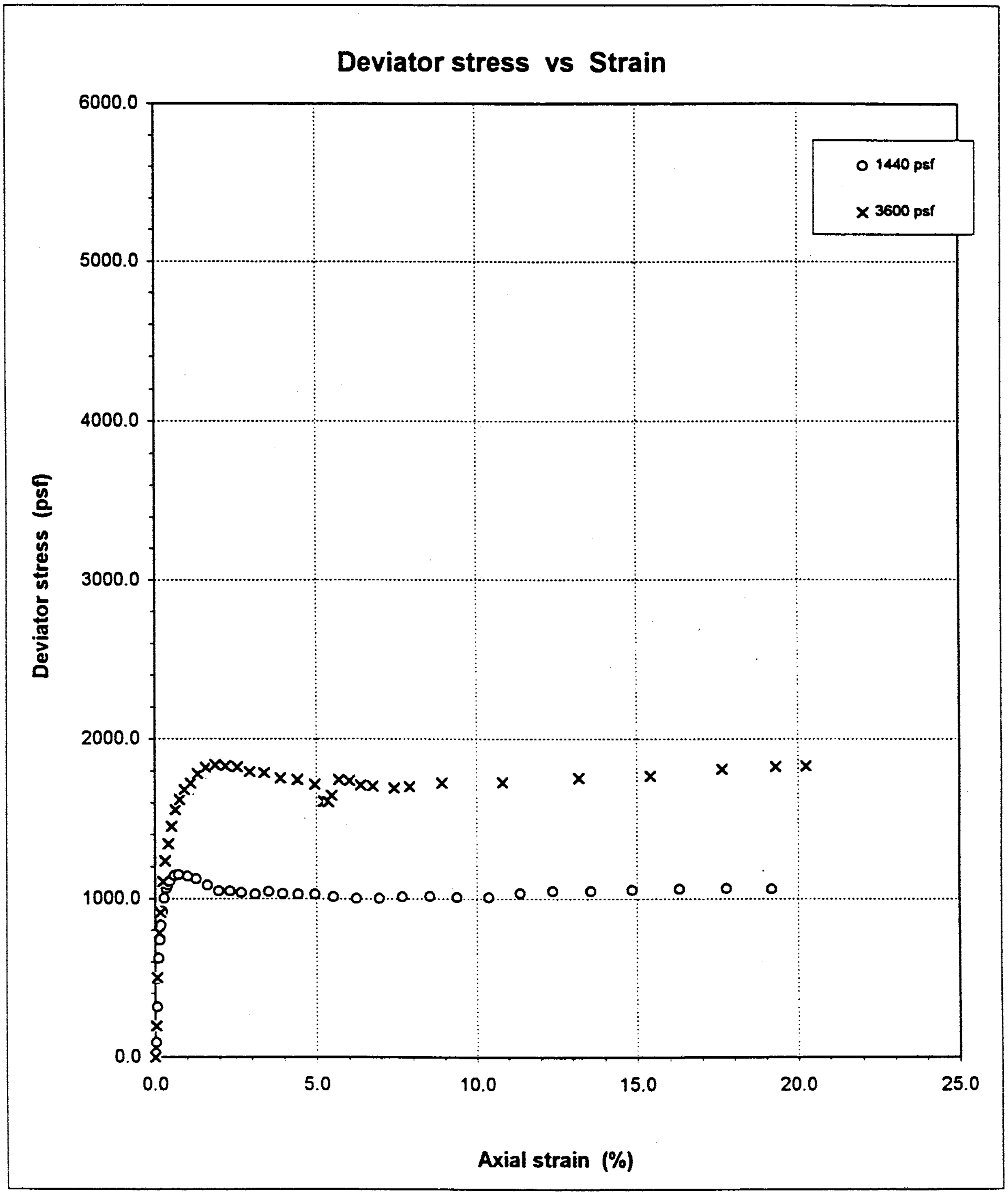
CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 6
SAMPLE NUMBER: S - 1
DEPTH (ft.): 10-12
SOIL TYPE: (CL) Dark brown silty clay w/ tr. sand & f. gravel

c = 0 psf
ϕ' = 26.1 deg.



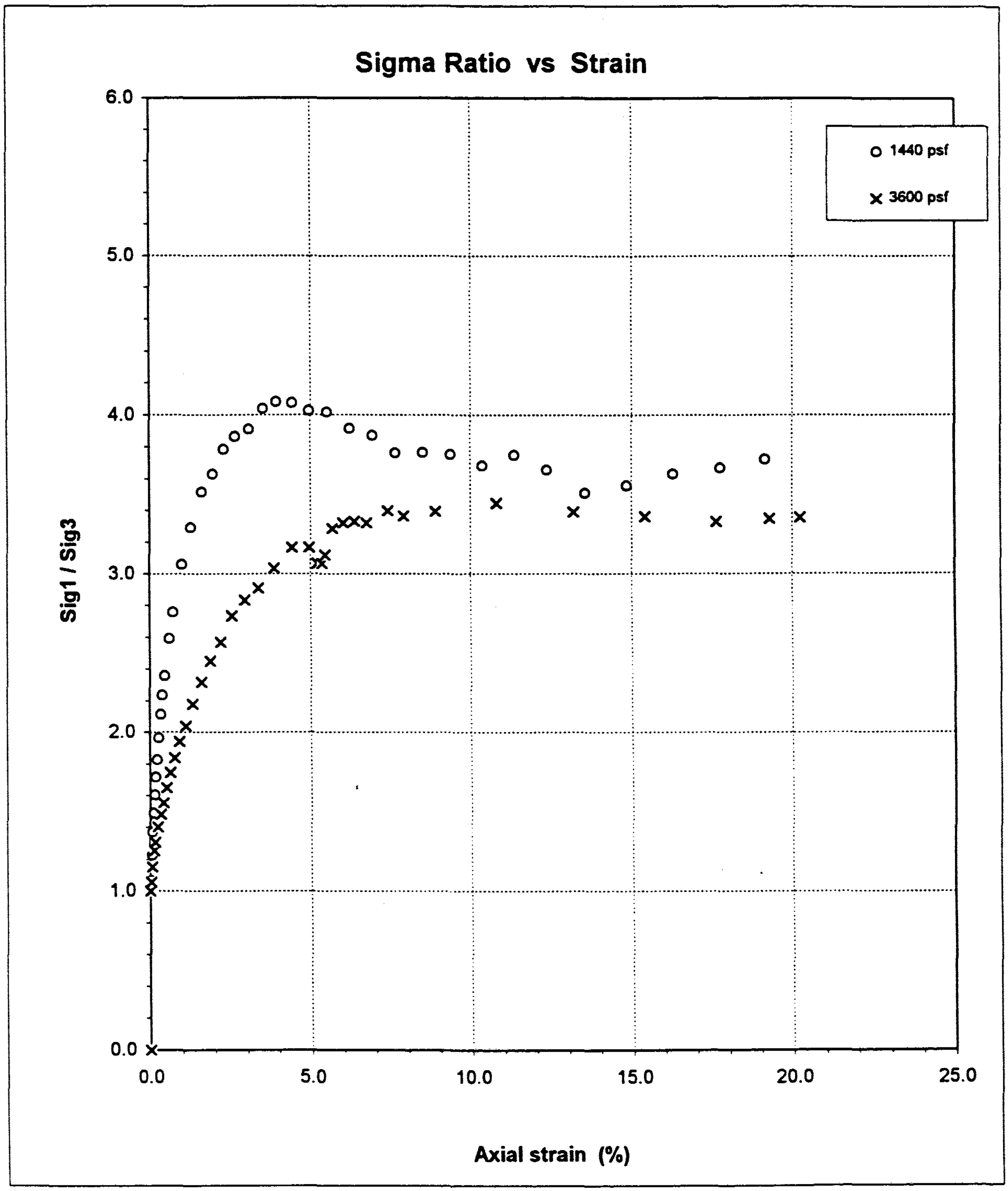
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 6
SAMPLE NUMBER: S - 1
DEPTH (ft.): 10-12
SOIL TYPE: (CL) Dark brown silty clay w/ tr. sand & f. gravel



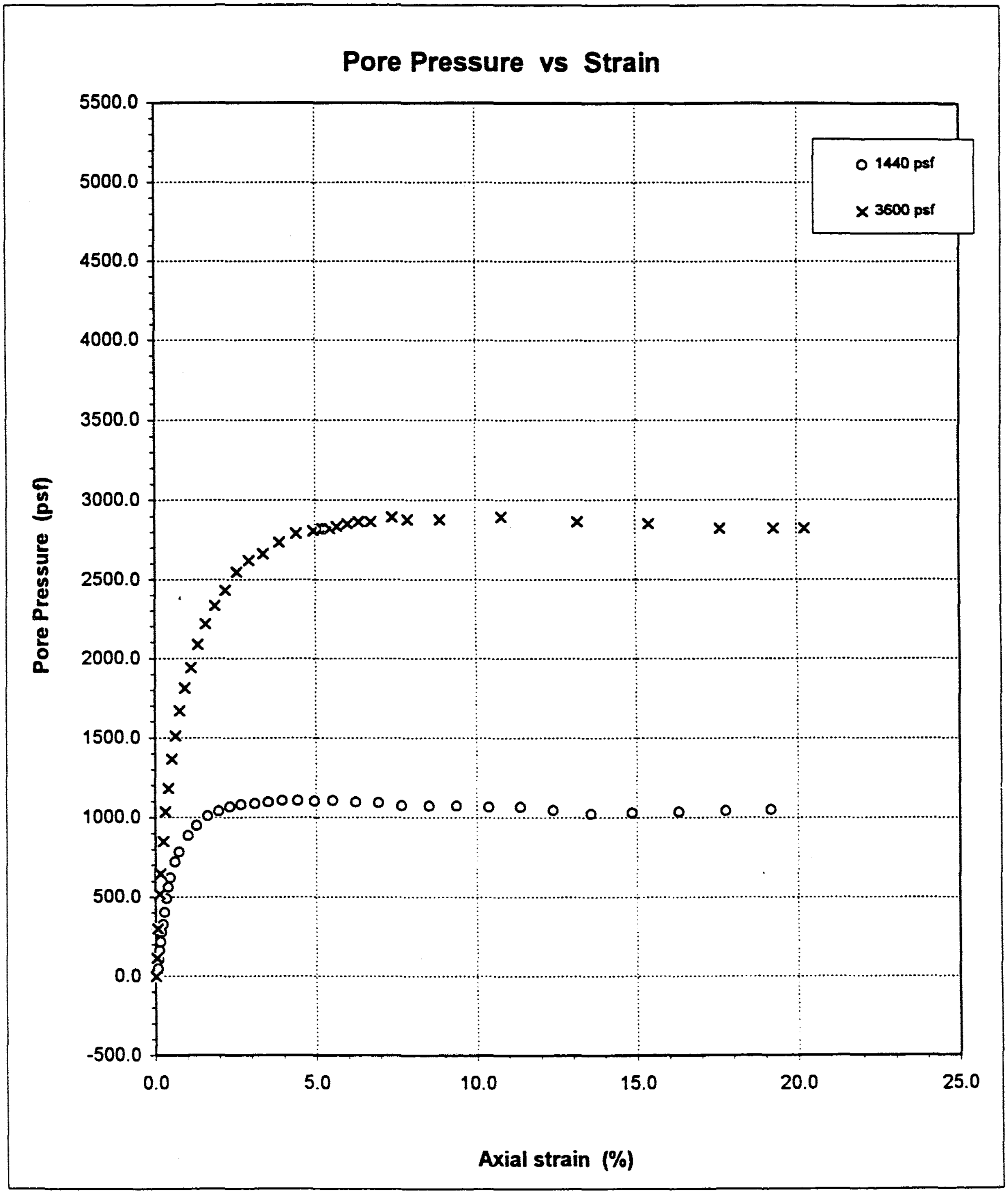
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 6
SAMPLE NUMBER: S - 1
DEPTH (ft.): 10-12
SOIL TYPE: (CL) Dark brown silty clay w/ tr. sand & f. gravel



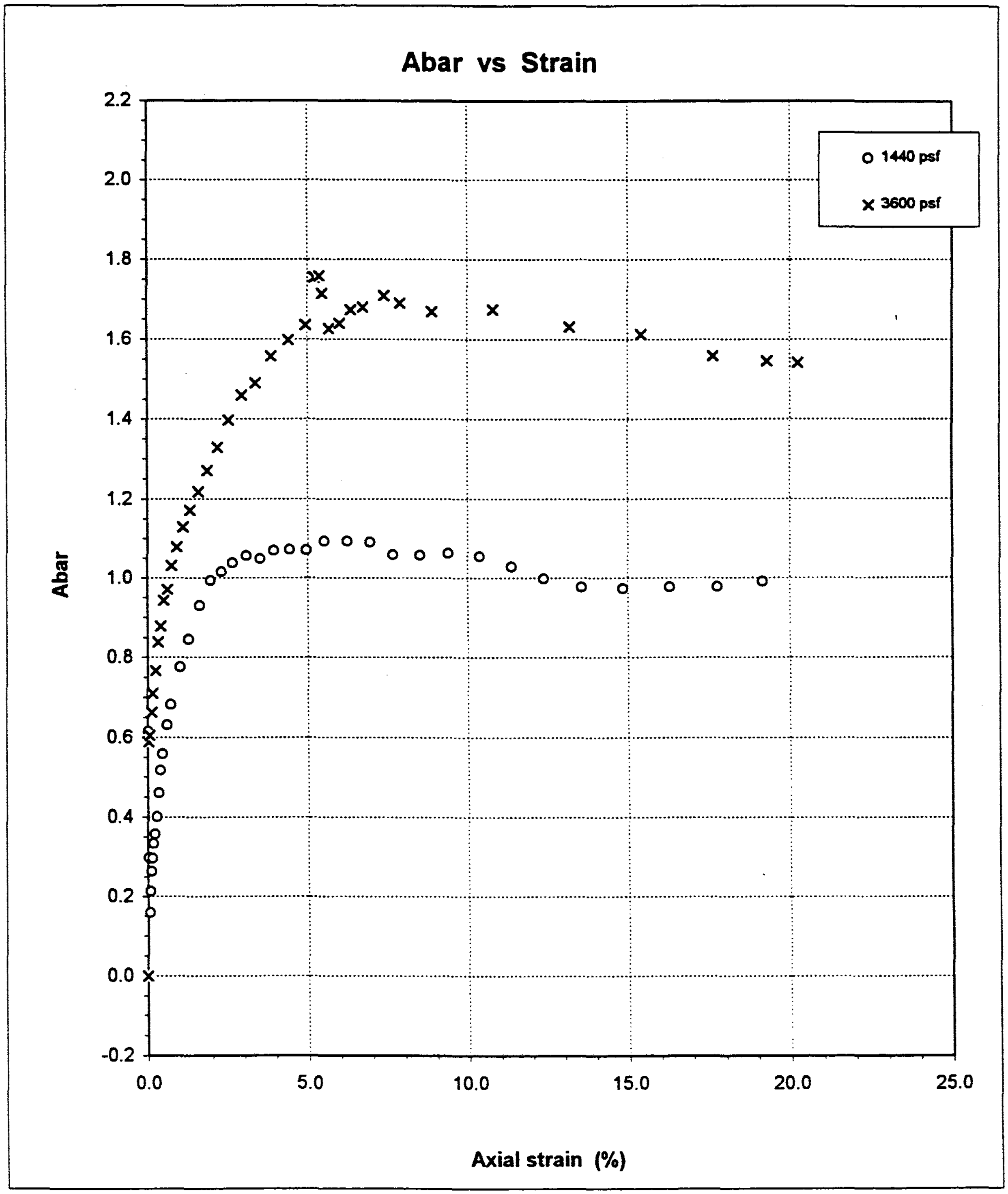
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 6
SAMPLE NUMBER: S - 1
DEPTH (ft.): 10-12
SOIL TYPE: (CL) Dark brown silty clay w/ tr. sand & f. gravel



TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 6
SAMPLE NUMBER: S - 1
DEPTH (ft.): 10-12
SOIL TYPE: (CL) Dark brown silty clay w/ tr. sand & f. gravel



TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 6
SAMPLE NUMBER: S - 1
DEPTH (ft.): 10-12
SOIL TYPE: (CL) Dark brown silty clay w/ tr. sand & f. gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	1129.1	1204.9	
HEIGHT(in.) =	6.000	5.980	
AREA(sq.in.) =	6.400	6.406	
VOLUME(c.c.) =	629.25	627.75	
WET DENSITY (Pcf) =	112.0	119.8	
DRY DENSITY (Pcf) =	96.1	96.3	
MOISTURE (%) =	16.6	24.4	
Gs (Assumed) =	2.70		
VOID RATIO =	0.754	0.750	
% SATURATION =	59.3	87.8	

DATA REDUCTIONS:

LOAD FACTOR = 0.1238589
DISPL. FACTOR = 0.0002997
P.W.P. FACTOR = 0.031711
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 1440 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	1440.0	1440.0	1.00	1440.0	0.0	0.00
0.02	22.3	13.7	1426.3	1448.6	1.02	1437.4	11.1	0.62
0.04	91.8	27.4	1412.6	1504.4	1.07	1458.5	45.9	0.30
0.06	314.4	50.2	1389.8	1704.2	1.23	1547.0	157.2	0.16
0.09	492.4	105.0	1335.0	1827.3	1.37	1581.2	246.2	0.21
0.12	622.9	164.4	1275.6	1898.6	1.49	1587.1	311.5	0.26
0.15	736.7	219.2	1220.8	1957.5	1.60	1589.2	368.4	0.30
0.19	833.7	278.6	1161.4	1995.2	1.72	1578.3	416.9	0.33
0.23	919.5	328.8	1111.2	2030.7	1.83	1571.0	459.7	0.36
0.28	1002.3	401.8	1038.2	2040.5	1.97	1539.3	501.2	0.40
0.34	1059.9	488.6	951.4	2011.3	2.11	1481.4	530.0	0.46
0.41	1084.2	561.7	878.3	1962.5	2.23	1420.4	542.1	0.52
0.47	1111.2	621.0	819.0	1930.2	2.36	1374.6	555.6	0.56
0.61	1142.9	721.5	718.5	1861.4	2.59	1290.0	571.5	0.63
0.74	1149.7	785.4	654.6	1804.3	2.76	1229.4	574.9	0.68
1.01	1141.0	885.9	554.1	1695.1	3.06	1124.6	570.5	0.78
1.28	1124.1	949.8	490.2	1614.3	3.29	1052.3	562.1	0.84
1.63	1084.6	1009.2	430.8	1515.4	3.52	973.1	542.3	0.93
1.98	1048.0	1041.1	398.9	1446.8	3.63	922.8	524.0	0.99
2.33	1047.0	1064.0	376.0	1423.0	3.78	899.5	523.5	1.02
2.68	1037.8	1077.7	362.3	1400.1	3.86	881.2	518.9	1.04
3.10	1027.9	1086.8	353.2	1381.1	3.91	867.1	513.9	1.06
3.52	1044.9	1095.9	344.1	1389.0	4.04	866.5	522.5	1.05
3.95	1032.3	1105.1	334.9	1367.2	4.08	851.1	516.1	1.07
4.45	1029.6	1105.1	334.9	1364.5	4.07	849.7	514.8	1.07
4.95	1026.8	1100.5	339.5	1366.3	4.02	852.9	513.4	1.07
5.52	1010.1	1105.1	334.9	1345.0	4.02	840.0	505.0	1.09
6.23	1002.5	1095.9	344.1	1346.5	3.91	845.3	501.2	1.09
6.95	1000.1	1091.4	348.6	1348.7	3.87	848.7	500.0	1.09
7.66	1013.0	1073.1	366.9	1379.9	3.76	873.4	506.5	1.06
8.52	1013.7	1073.1	366.9	1380.6	3.76	873.7	506.9	1.06
9.38	1009.2	1073.1	366.9	1376.1	3.75	871.5	504.6	1.06
10.38	1008.1	1064.0	376.0	1384.1	3.68	880.1	504.0	1.06
11.38	1033.9	1064.0	376.0	1409.9	3.75	893.0	516.9	1.03
12.39	1046.5	1045.7	394.3	1440.7	3.65	917.5	523.2	1.00
13.56	1046.9	1022.9	417.1	1464.1	3.51	940.6	523.5	0.98
14.85	1055.0	1027.4	412.6	1467.5	3.56	940.1	527.5	0.97
16.30	1060.3	1036.6	403.4	1463.7	3.63	933.6	530.1	0.98
17.77	1064.6	1041.1	398.9	1463.5	3.67	931.2	532.3	0.98
19.16	1060.0	1050.3	389.7	1449.8	3.72	919.7	530.0	0.99

TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 6
SAMPLE NUMBER: S - 1
DEPTH (ft.): 10-12
SOIL TYPE: (CL) Dark brown silty clay w/ tr. sand & f. gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	1181.2	1238.5	
HEIGHT(in.) =	6.000	5.872	
AREA(sq.in.) =	6.513	6.319	
VOLUME(c.c.) =	640.32	608.07	
WET DENSITY (Pcf) =	115.1	127.1	
DRY DENSITY (Pcf) =	99.6	104.9	
MOISTURE (%) =	15.5	21.2	
Gs (Assumed) =	2.70		
VOID RATIO =	0.691	0.606	
% SATURATION =	60.7	94.2	

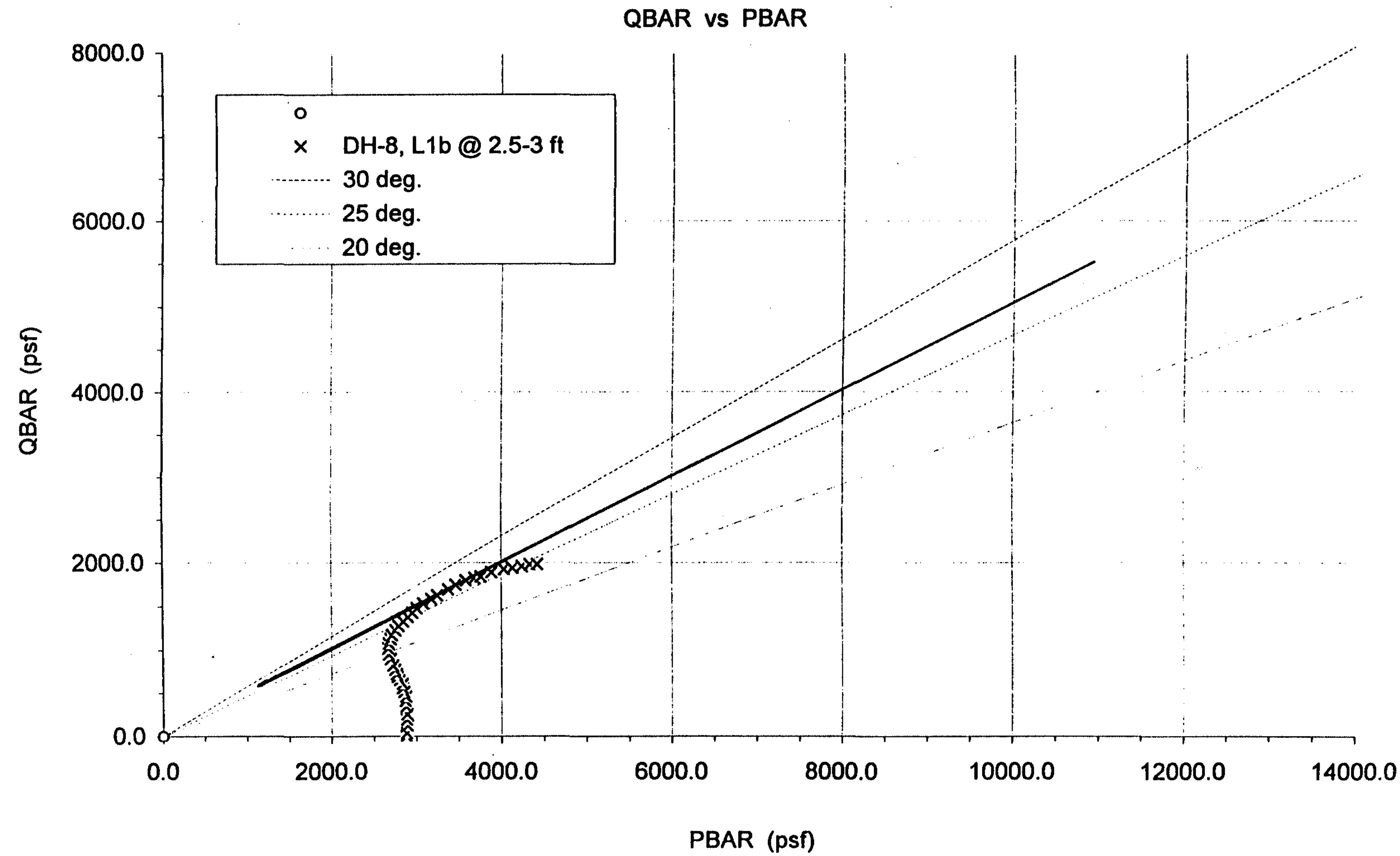
DATA REDUCTIONS:

LOAD FACTOR = 9.55
DISPL. FACTOR = 0.001
P.W.P. FACTOR = 1.0
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 3600 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	3600.0	3600.0	1.00	3600.0	0.0	0.00
0.03	195.8	115.2	3484.8	3680.6	1.06	3582.7	97.9	0.59
0.07	500.2	302.4	3297.6	3797.8	1.15	3547.7	250.1	0.60
0.13	782.4	518.4	3081.6	3864.0	1.25	3472.8	391.2	0.66
0.17	912.4	648.0	2952.0	3864.4	1.31	3408.2	456.2	0.71
0.25	1107.1	849.6	2750.4	3857.5	1.40	3304.0	553.6	0.77
0.32	1236.4	1036.8	2563.2	3799.6	1.48	3181.4	618.2	0.84
0.41	1343.7	1180.8	2419.2	3762.9	1.56	3091.1	671.9	0.88
0.51	1450.6	1368.0	2232.0	3682.6	1.65	2957.3	725.3	0.94
0.63	1557.0	1512.0	2088.0	3645.0	1.75	2866.5	778.5	0.97
0.77	1619.6	1670.4	1929.6	3549.2	1.84	2739.4	809.8	1.03
0.92	1681.8	1814.4	1785.6	3467.4	1.94	2626.5	840.9	1.08
1.11	1721.7	1944.0	1656.0	3377.7	2.04	2516.8	860.8	1.13
1.33	1782.2	2088.0	1512.0	3294.2	2.18	2403.1	891.1	1.17
1.58	1820.5	2217.6	1382.4	3202.9	2.32	2292.6	910.2	1.22
1.87	1836.5	2332.8	1267.2	3103.7	2.45	2185.4	918.2	1.27
2.20	1830.4	2433.6	1166.4	2996.8	2.57	2081.6	915.2	1.33
2.55	1823.7	2548.8	1051.2	2874.9	2.73	1963.1	911.9	1.40
2.95	1795.3	2620.8	979.2	2774.5	2.83	1876.8	897.6	1.46
3.39	1787.1	2664.0	936.0	2723.1	2.91	1829.5	893.5	1.49
3.88	1757.0	2736.0	864.0	2621.0	3.03	1742.5	878.5	1.56
4.43	1747.1	2793.6	806.4	2553.5	3.17	1679.9	873.5	1.60
4.96	1716.7	2808.0	792.0	2508.7	3.17	1650.4	858.4	1.64
5.23	1608.7	2822.4	777.6	2386.3	3.07	1581.9	804.3	1.75
5.36	1606.4	2822.4	777.6	2384.0	3.07	1580.8	803.2	1.76
5.47	1645.8	2822.4	777.6	2423.4	3.12	1600.5	822.9	1.71
5.69	1744.5	2836.8	763.2	2507.7	3.29	1635.5	872.3	1.63
6.01	1738.6	2851.2	748.8	2487.4	3.32	1618.1	869.3	1.64
6.37	1711.6	2865.6	734.4	2446.0	3.33	1590.2	855.8	1.67
6.74	1704.7	2865.6	734.4	2439.1	3.32	1586.8	852.4	1.68
7.41	1692.6	2894.4	705.6	2398.2	3.40	1551.9	846.3	1.71
7.90	1703.6	2880.0	720.0	2423.6	3.37	1571.8	851.8	1.69
8.91	1724.7	2880.0	720.0	2444.7	3.40	1582.3	862.3	1.67
10.81	1727.4	2894.4	705.6	2433.0	3.45	1569.3	863.7	1.68
13.20	1756.7	2865.6	734.4	2491.1	3.39	1612.8	878.4	1.63
15.41	1767.2	2851.2	748.8	2516.0	3.36	1632.4	883.6	1.61
17.64	1810.2	2822.4	777.6	2587.8	3.33	1682.7	905.1	1.56
19.29	1826.5	2822.4	777.6	2604.1	3.35	1690.9	913.3	1.55
20.25	1831.0	2822.4	777.6	2608.6	3.35	1693.1	915.5	1.54

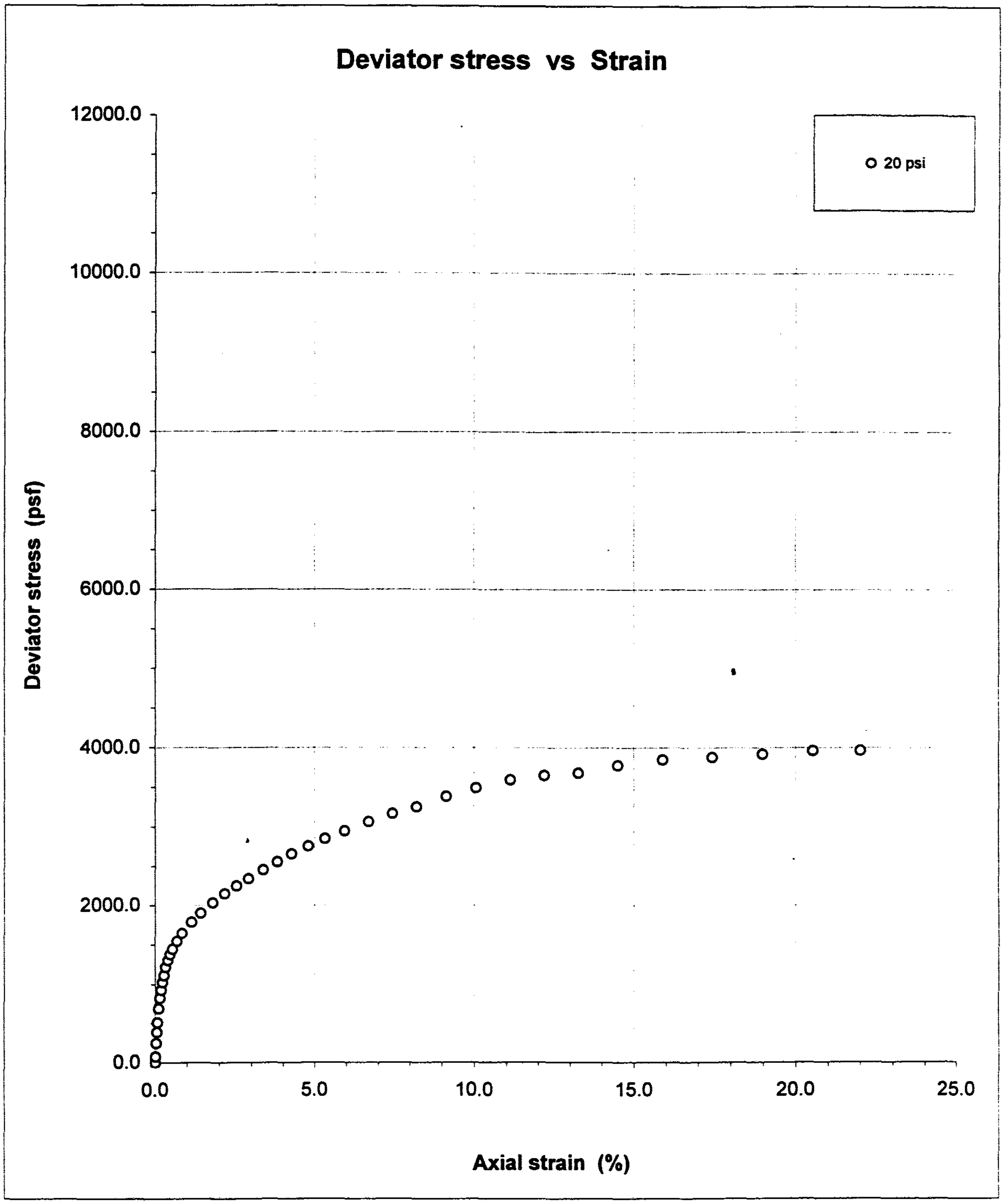
CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: --
SAMPLE NUMBER: --
DEPTH (ft.): --
SOIL TYPE: (CL)

c = 0
$\phi' = 30.0$ deg.



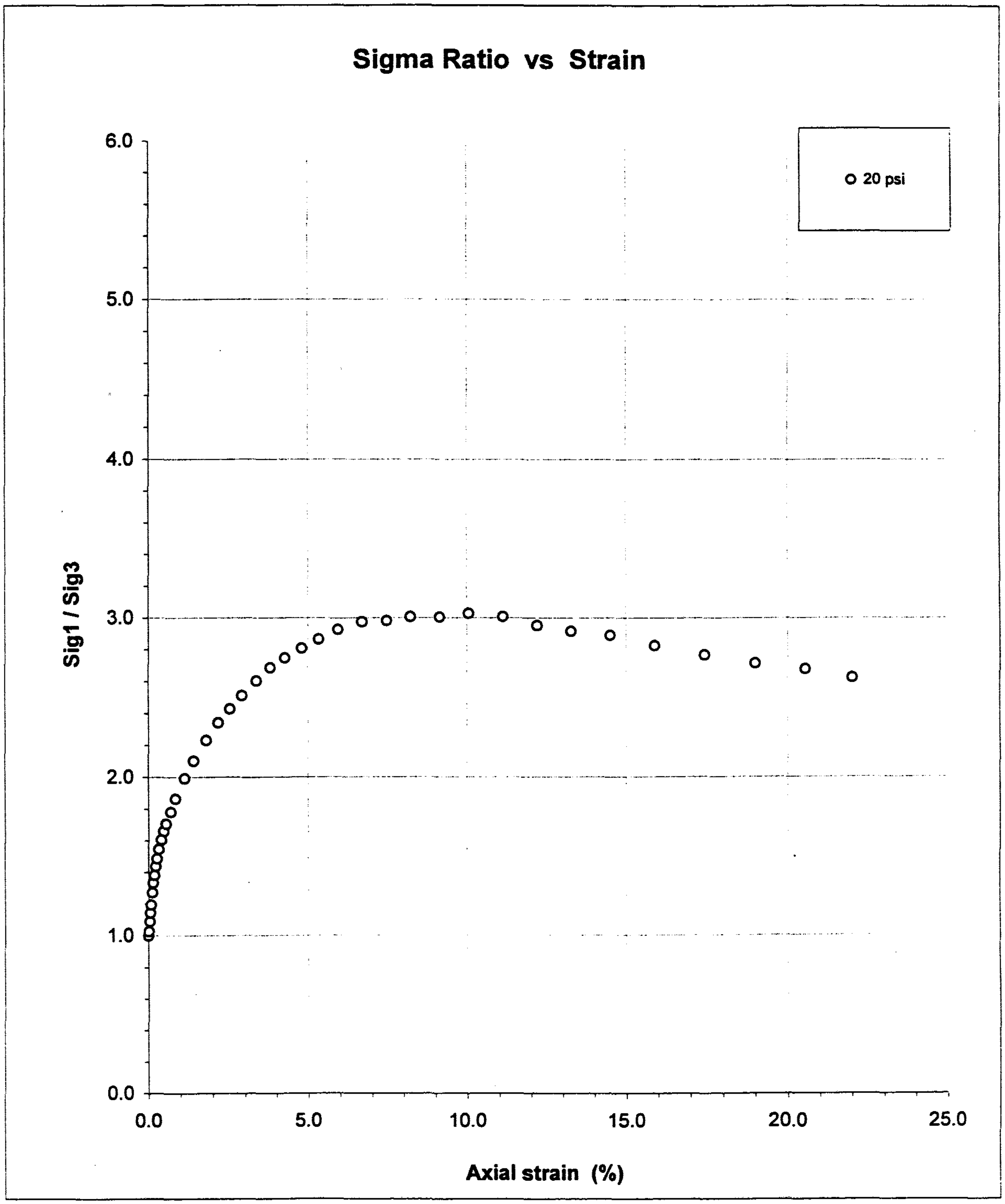
TXCUPP

JOB NUMBER: Thompson Creek
BORING NUMBER: DH - 8
SAMPLE NUMBER: L 1b
DEPTH (ft.): 2.2 - 3
SOIL TYPE: (CH) Dark brown fat clay



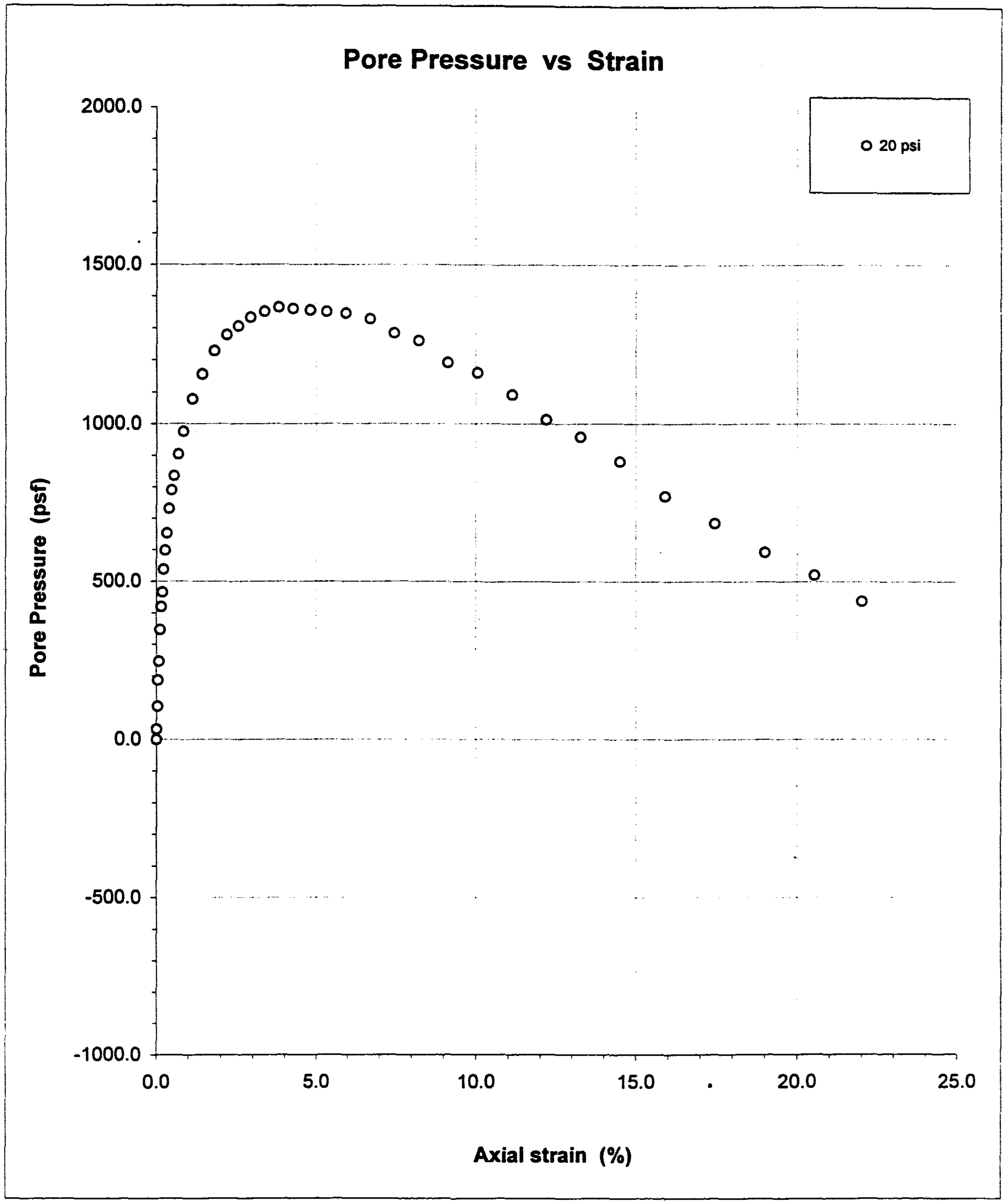
TXCUPP

JOB NUMBER: Thompson Creek
BORING NUMBER: DH - 8
SAMPLE NUMBER: L 1b
DEPTH (ft.): 2.2 - 3
SOIL TYPE: (CH) Dark brown fat clay



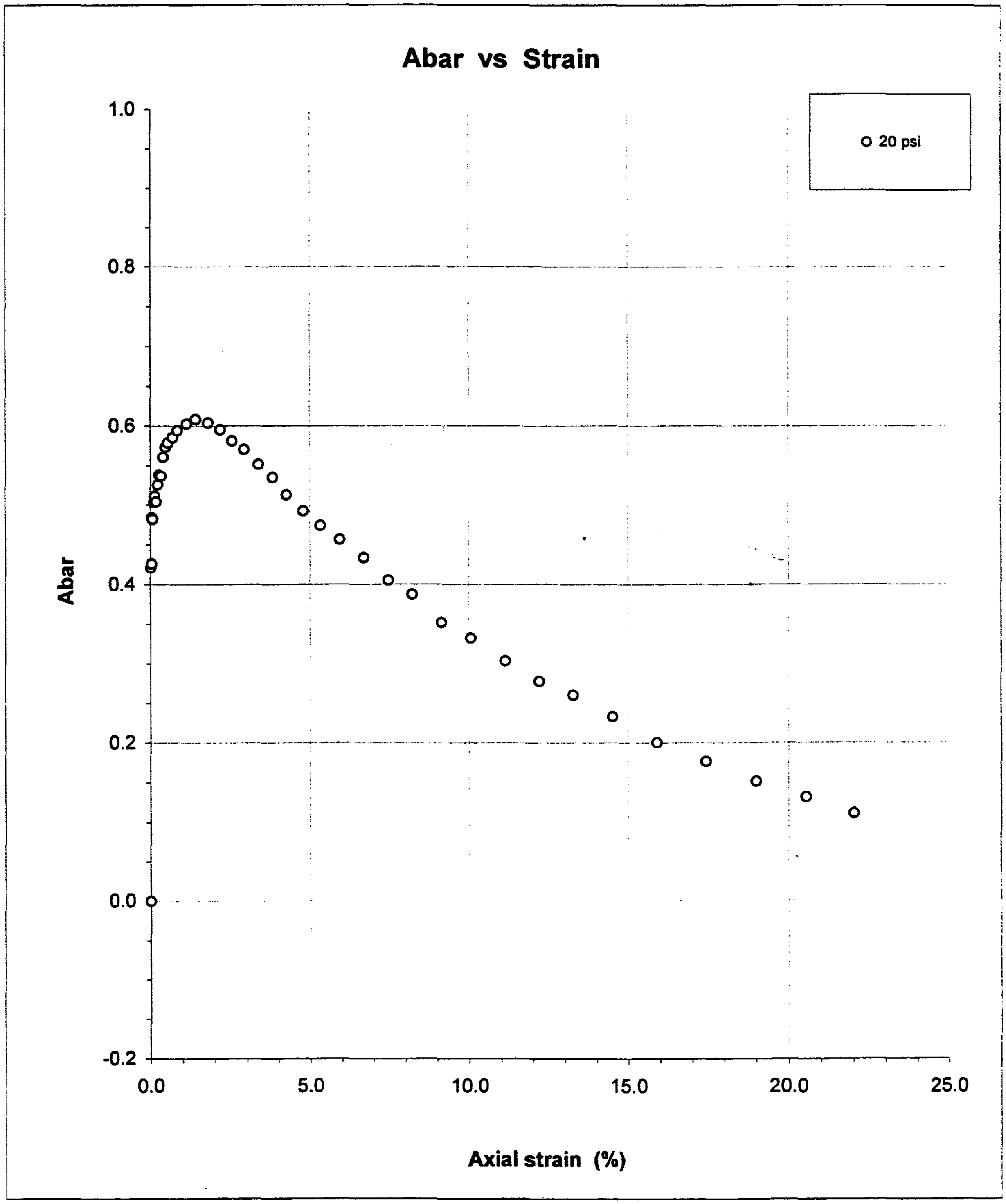
TXCUPP

JOB NUMBER: Thompson Creek
BORING NUMBER: DH - 8
SAMPLE NUMBER: L 1b
DEPTH (ft.): 2.2 - 3
SOIL TYPE: (CH) Dark brown fat clay



TXCUPP

JOB NUMBER: Thompson Creek
BORING NUMBER: DH - 8
SAMPLE NUMBER: L 1b
DEPTH (ft.): 2.2 - 3
SOIL TYPE: (CH) Dark brown fat clay



TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: Thompson Creek
BORING NUMBER: DH - 8
SAMPLE NUMBER: L 1b
DEPTH (ft.): 2.2 - 3
SOIL TYPE: (CH) Dark brown fat clay

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	714.8	768.9	
HEIGHT(in.) =	5.030	4.986	
AREA(sq.in.) =	4.552	4.702	
VOLUME(c.c.) =	375.22	384.22	
WET DENSITY (Pcf) =	118.9	124.9	
DRY DENSITY (Pcf) =	101.0	98.6	
MOISTURE (%) =	17.7	26.6	
Gs (Assumed) =	2.70		
VOID RATIO =	0.668	0.708	
% SATURATION =	71.6	101.5	

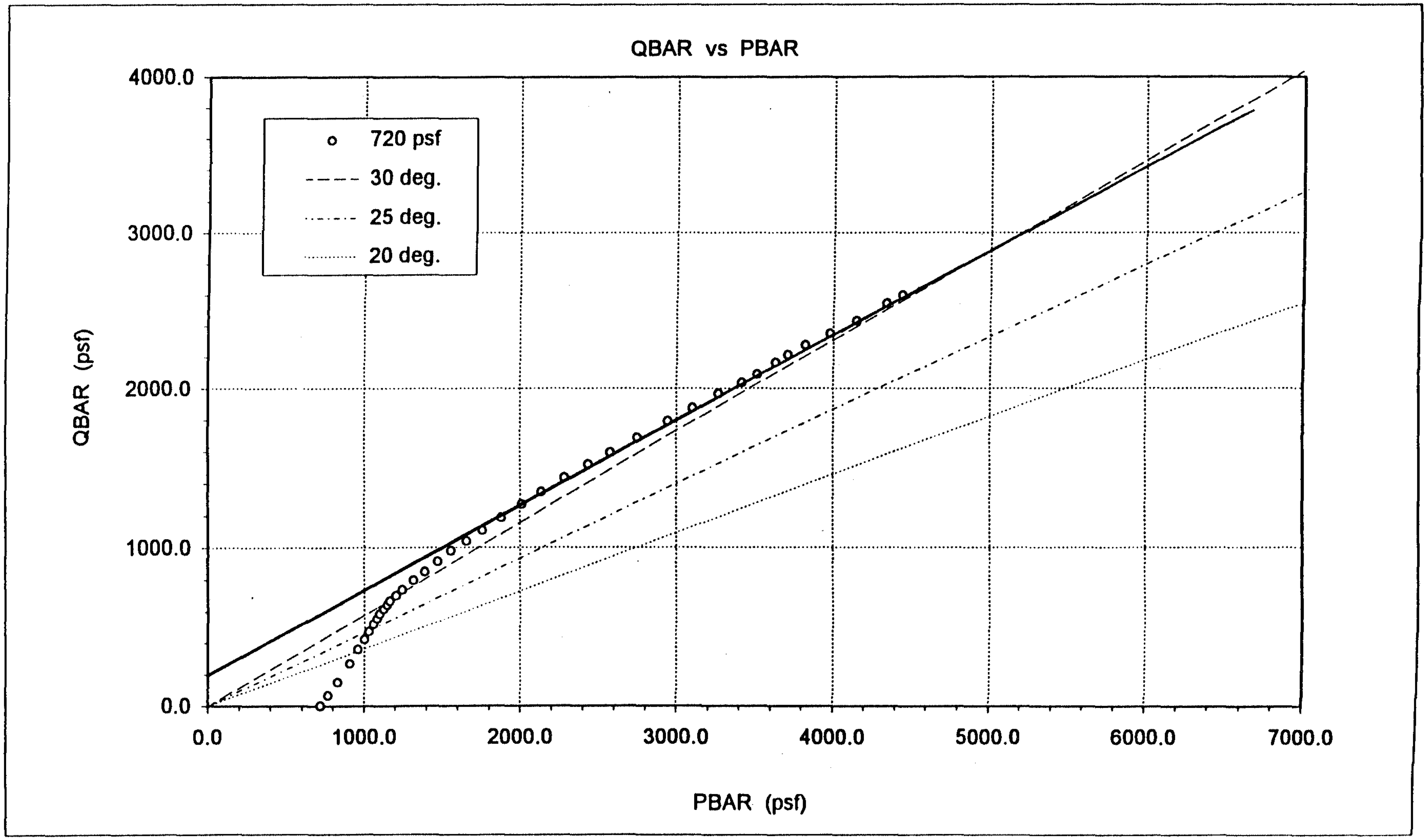
DATA REDUCTIONS:

LOAD FACTOR = 0.1238589
DISPL. FACTOR = 0.0002997
P.W.P. FACTOR = 0.031711
RATE OF SHEARING = 0.045 in/hr.
CONFIN. PRESSURE = 2880 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	2880.0	2880.0	1.00	2880.0	0.0	0.00
0.01	75.8	32.0	2848.0	2923.9	1.03	2886.0	37.9	0.42
0.04	246.4	105.0	2775.0	3021.4	1.09	2898.2	123.2	0.43
0.05	386.7	187.2	2692.8	3079.4	1.14	2886.1	193.3	0.48
0.08	511.6	246.6	2633.4	3145.0	1.19	2889.2	255.8	0.48
0.11	689.5	347.0	2533.0	3222.5	1.27	2877.7	344.8	0.50
0.14	821.9	420.1	2459.9	3281.7	1.33	2870.8	410.9	0.51
0.18	923.8	465.8	2414.2	3338.0	1.38	2876.1	461.9	0.50
0.23	1025.5	538.8	2341.2	3366.7	1.44	2853.9	512.8	0.53
0.27	1112.1	598.2	2281.8	3393.9	1.49	2837.8	556.0	0.54
0.32	1217.3	653.0	2227.0	3444.3	1.55	2835.7	608.7	0.54
0.40	1303.3	730.6	2149.4	3452.7	1.61	2801.0	651.7	0.56
0.47	1377.9	790.0	2090.0	3467.9	1.66	2779.0	688.9	0.57
0.55	1444.7	835.6	2044.4	3489.1	1.71	2766.7	722.4	0.58
0.69	1544.3	904.1	1975.9	3520.2	1.78	2748.0	772.2	0.59
0.84	1643.5	977.2	1902.8	3546.3	1.86	2724.6	821.8	0.59
1.14	1788.6	1077.7	1802.3	3591.0	1.99	2696.6	894.3	0.60
1.42	1899.3	1155.3	1724.7	3624.0	2.10	2674.4	949.7	0.61
1.80	2033.7	1228.4	1651.6	3685.3	2.23	2668.5	1016.8	0.60
2.17	2148.4	1278.6	1601.4	3749.8	2.34	2675.6	1074.2	0.60
2.54	2247.4	1306.0	1574.0	3821.4	2.43	2697.7	1123.7	0.58
2.92	2338.1	1333.4	1546.6	3884.7	2.51	2715.7	1169.0	0.57
3.37	2452.0	1351.6	1528.4	3980.3	2.60	2754.3	1226.0	0.55
3.82	2553.6	1365.3	1514.7	4068.3	2.69	2791.5	1276.8	0.53
4.27	2654.2	1360.8	1519.2	4173.5	2.75	2846.3	1327.1	0.51
4.80	2754.9	1356.2	1523.8	4278.7	2.81	2901.3	1377.5	0.49
5.33	2850.9	1351.6	1528.4	4379.3	2.87	2953.8	1425.5	0.47
5.94	2950.2	1347.1	1532.9	4483.1	2.92	3008.0	1475.1	0.46
6.71	3064.3	1328.8	1551.2	4615.4	2.98	3083.3	1532.1	0.43
7.47	3165.5	1283.2	1596.8	4762.4	2.98	3179.6	1582.8	0.41
8.23	3251.0	1260.3	1619.7	4870.7	3.01	3245.2	1625.5	0.39
9.14	3384.0	1191.8	1688.2	5072.2	3.00	3380.2	1692.0	0.35
10.06	3489.9	1159.9	1720.1	5210.0	3.03	3465.1	1744.9	0.33
11.13	3593.3	1091.4	1788.6	5381.9	3.01	3585.3	1796.7	0.30
12.20	3646.6	1013.7	1866.3	5512.9	2.95	3689.6	1823.3	0.28
13.27	3681.1	958.9	1921.1	5602.2	2.92	3761.6	1840.6	0.26
14.50	3777.8	881.3	1998.7	5776.4	2.89	3887.6	1888.9	0.23
15.90	3850.1	771.7	2108.3	5958.4	2.83	4033.3	1925.1	0.20
17.44	3879.6	685.0	2195.0	6074.6	2.77	4134.8	1939.8	0.18
18.99	3917.3	593.6	2286.4	6203.7	2.71	4245.0	1958.7	0.15
20.54	3957.1	520.6	2359.4	6316.6	2.68	4338.0	1978.6	0.13
22.01	3966.6	438.4	2441.6	6408.3	2.62	4424.9	1983.3	0.11

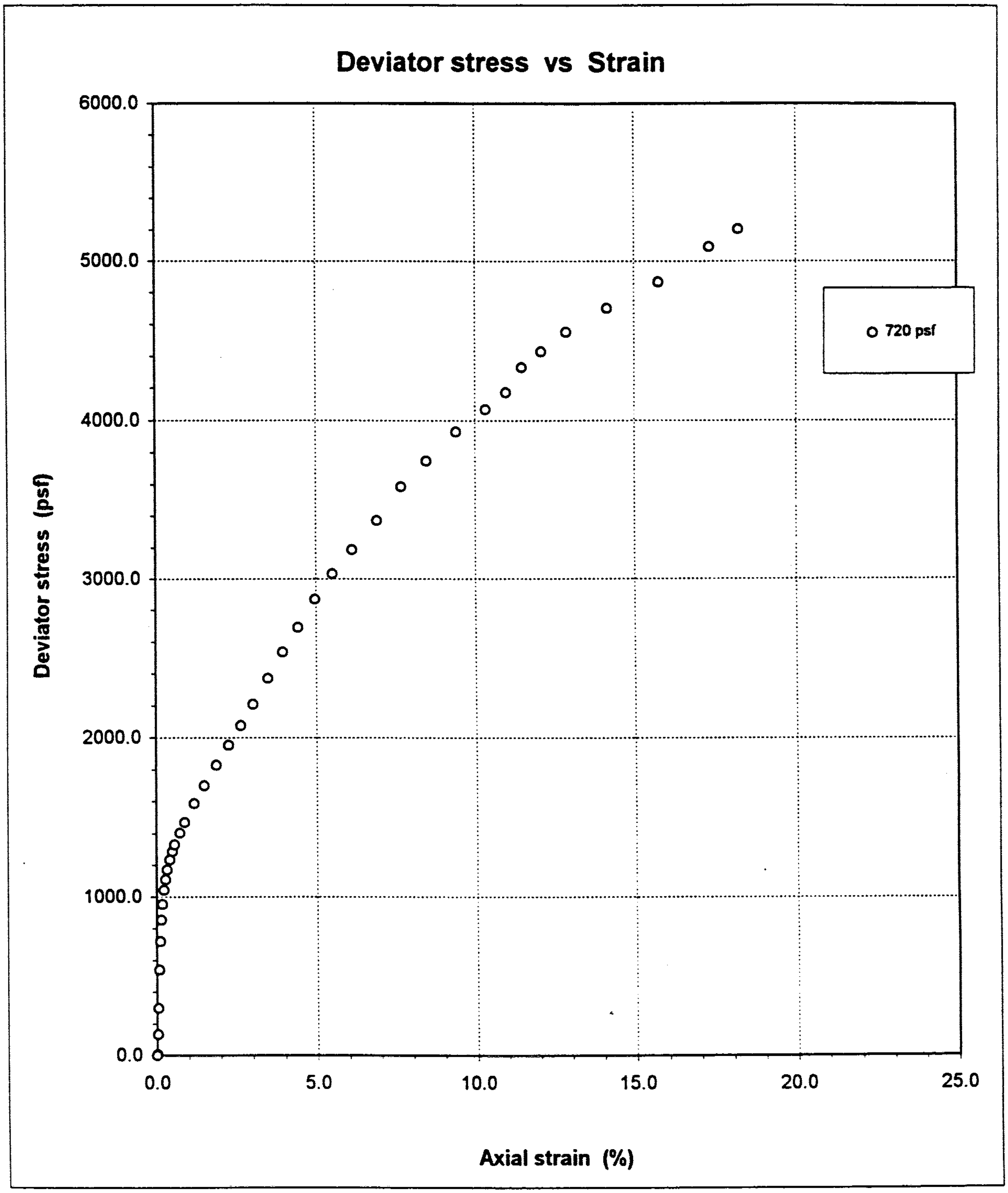
CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 10
SAMPLE NUMBER: L 2b
DEPTH (ft.): 5-5.5
SOIL TYPE: (CL) Brown sandy clay, tr. f. gravel

Dessicated Crust: Undrained shear strength may be unrealistically high
c = 237 psf
ϕ' = 32.5 deg.



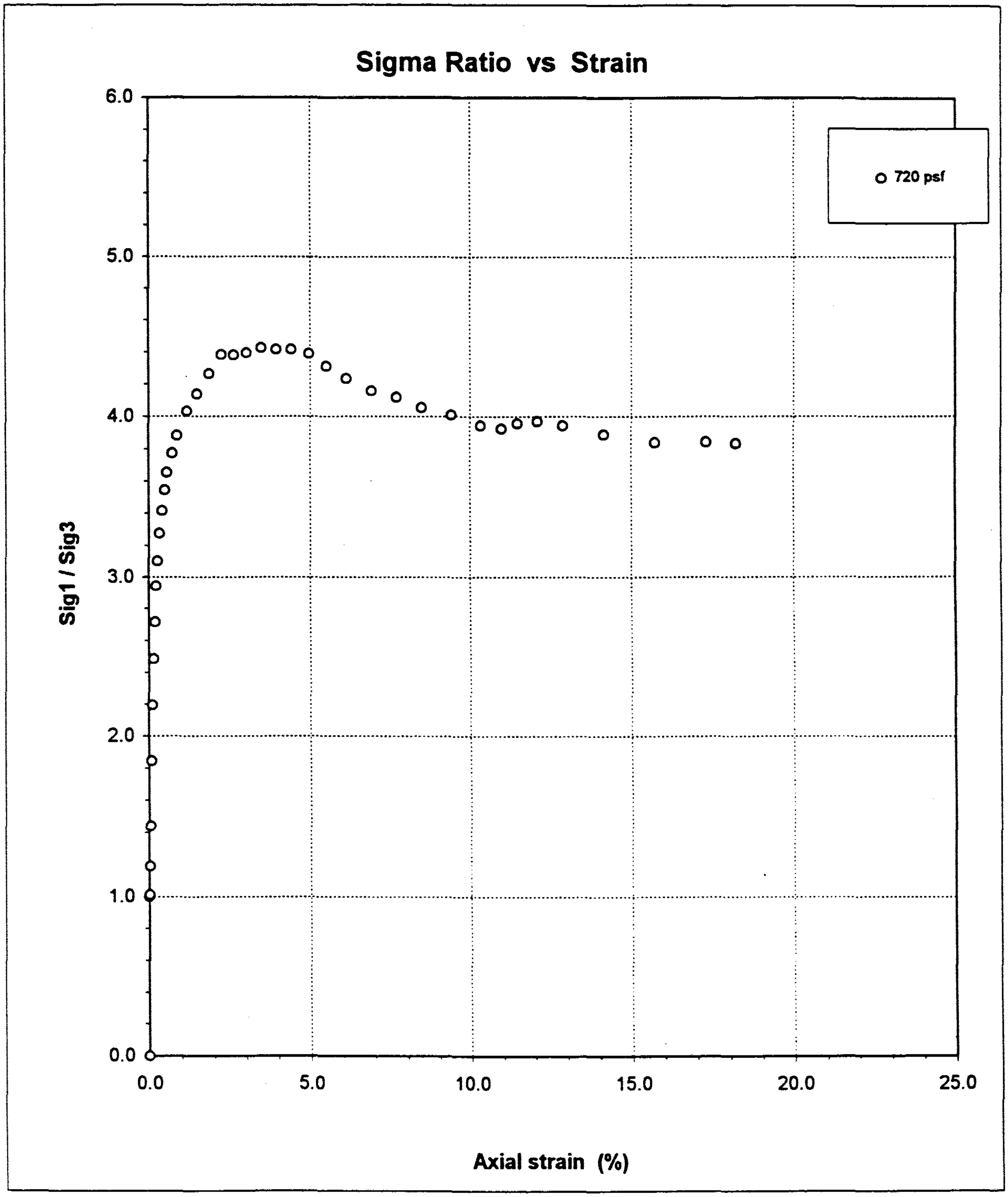
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 10
SAMPLE NUMBER: L 2b
DEPTH (ft.): 5-5.5
SOIL TYPE: (CL) Brown sandy clay, tr. f. gravel



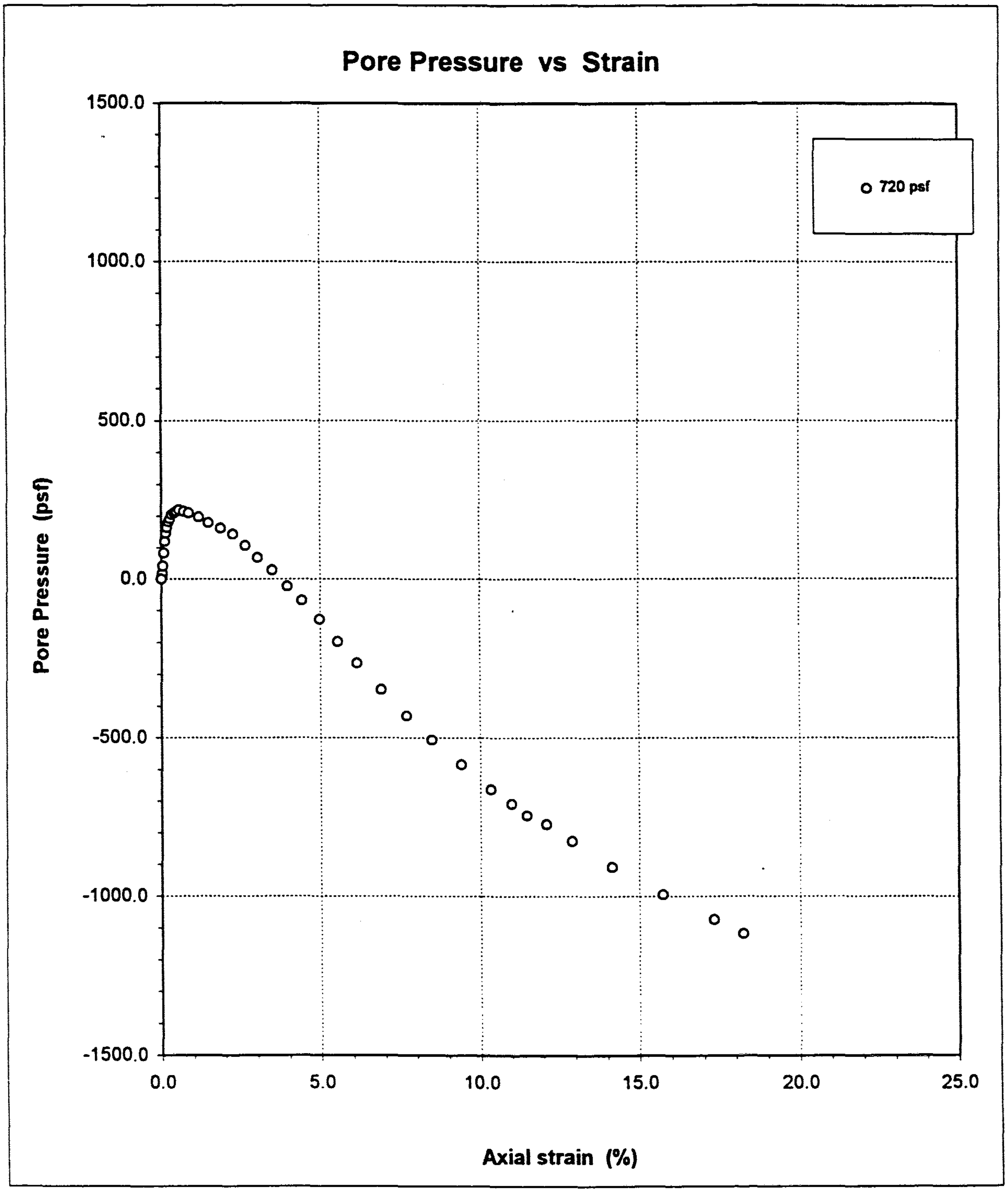
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 10
SAMPLE NUMBER: L 2b
DEPTH (ft.): 5-5.5
SOIL TYPE: (CL) Brown sandy clay, tr. f. gravel



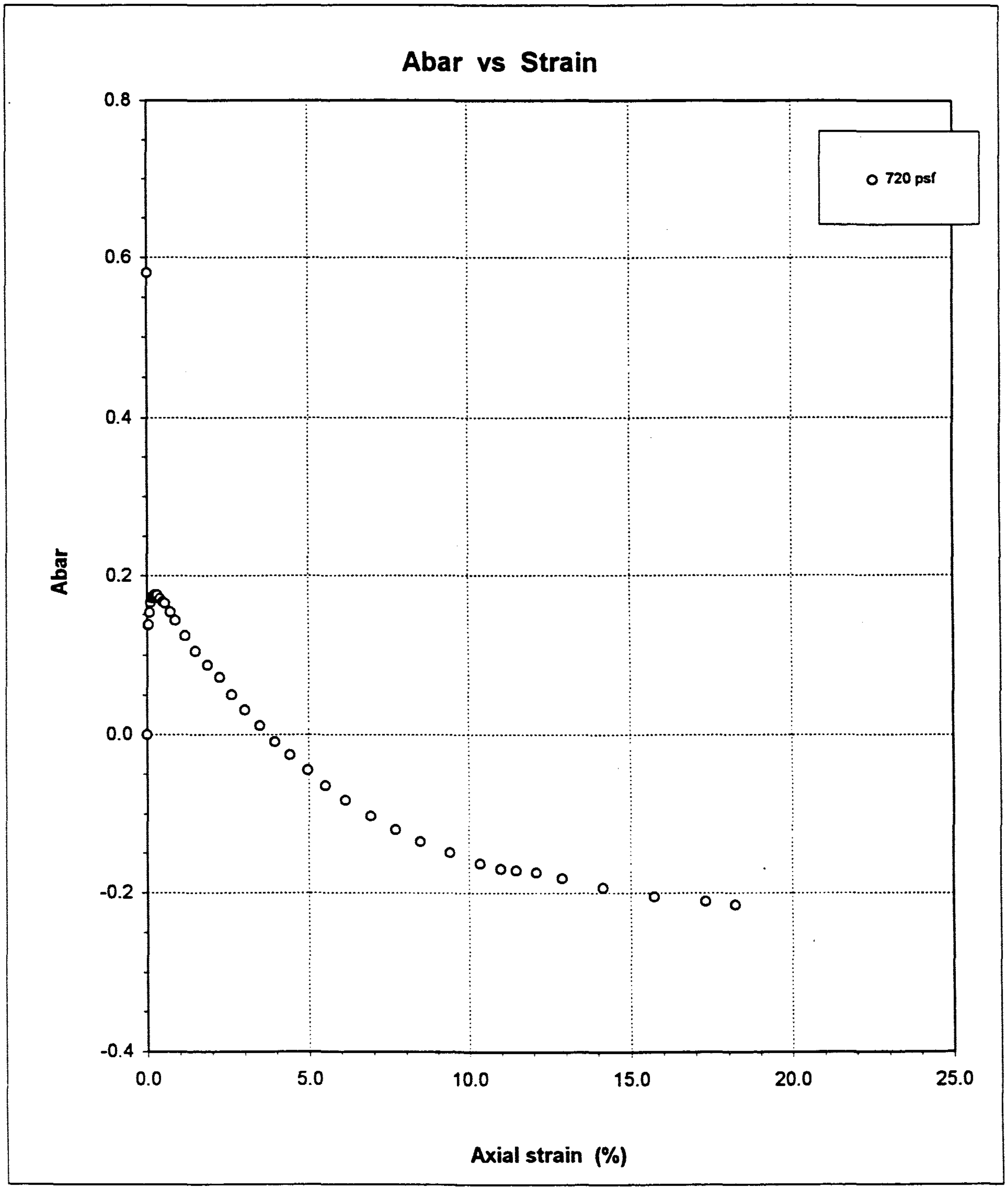
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 10
SAMPLE NUMBER: L 2b
DEPTH (ft.): 5-5.5
SOIL TYPE: (CL) Brown sandy clay, tr. f. gravel



TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 10
SAMPLE NUMBER: L´2b
DEPTH (ft.): 5-5.5
SOIL TYPE: (CL) Brown sandy clay, tr. f. gravel



TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 10
SAMPLE NUMBER: L 2b
DEPTH (ft.): 5-5.5
SOIL TYPE: (CL) Brown sandy clay, tr. f. gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	891.5	914.1	
HEIGHT(in.) =	5.500	5.491	
AREA(sq.in.) =	4.541	4.537	
VOLUME(c.c.) =	409.26	408.26	
WET DENSITY (Pcf) =	135.9	139.7	
DRY DENSITY (Pcf) =	123.0	123.3	
MOISTURE (%) =	10.5	13.3	
Gs (Assumed) =	2.70		
VOID RATIO =	0.369	0.366	
% SATURATION =	76.6	97.9	

DATA REDUCTIONS:

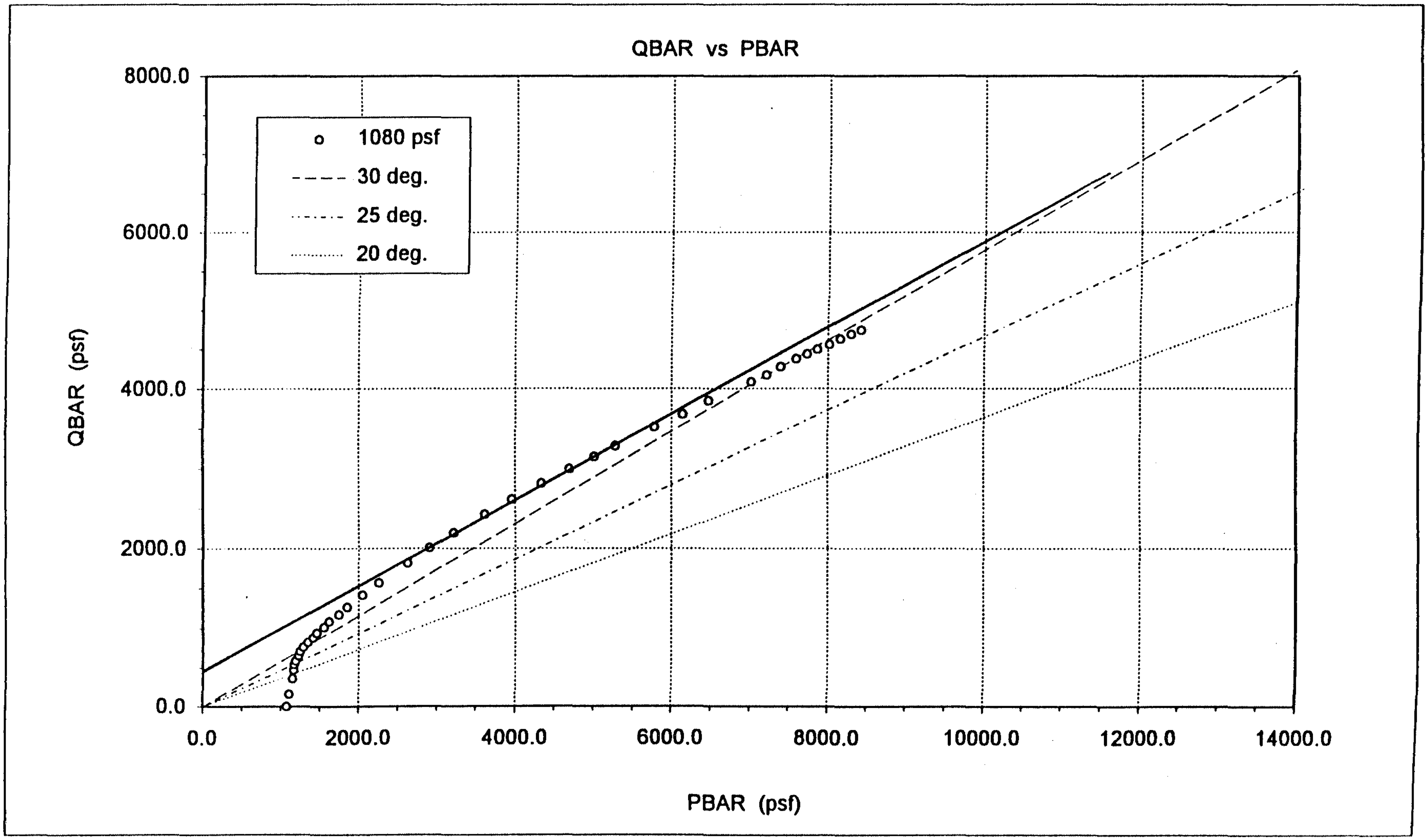
LOAD FACTOR = 0.1238589
DISPL. FACTOR = 0.0002997
P.W.P. FACTOR = 0.0317113
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 720 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	720.0	720.0	1.00	720.0	0.0	0.00
0.02	7.9	4.6	715.4	723.3	1.01	719.4	3.9	0.58
0.03	133.6	18.3	701.7	835.3	1.19	768.5	66.8	0.14
0.05	298.6	41.1	678.9	977.5	1.44	828.2	149.3	0.14
0.08	538.1	82.2	637.8	1175.9	1.84	906.9	269.1	0.15
0.11	718.6	118.7	601.3	1319.8	2.20	960.6	359.3	0.17
0.15	851.7	146.1	573.9	1425.6	2.48	999.7	425.9	0.17
0.19	953.4	164.4	555.6	1509.0	2.72	1032.3	476.7	0.17
0.23	1043.2	182.7	537.3	1580.5	2.94	1058.9	521.6	0.18
0.28	1109.4	191.8	528.2	1637.6	3.10	1082.9	554.7	0.17
0.34	1171.4	205.5	514.5	1685.9	3.28	1100.2	585.7	0.18
0.41	1233.1	210.1	509.9	1743.1	3.42	1126.5	616.6	0.17
0.49	1287.0	214.6	505.4	1792.3	3.55	1148.9	643.5	0.17
0.57	1329.0	219.2	500.8	1829.8	3.65	1165.3	664.5	0.16
0.73	1401.0	214.6	505.4	1906.4	3.77	1205.9	700.5	0.15
0.88	1469.0	210.1	509.9	1978.9	3.88	1244.4	734.5	0.14
1.18	1588.8	196.4	523.6	2112.4	4.03	1318.0	794.4	0.12
1.49	1700.0	178.1	541.9	2241.9	4.14	1391.9	850.0	0.10
1.87	1828.4	159.8	560.2	2388.6	4.26	1474.4	914.2	0.09
2.25	1955.8	141.6	578.4	2534.2	4.38	1556.3	977.9	0.07
2.64	2078.2	105.0	615.0	2693.1	4.38	1654.1	1039.1	0.05
3.03	2210.9	68.5	651.5	2862.4	4.39	1757.0	1105.5	0.03
3.49	2371.1	27.4	692.6	3063.7	4.42	1878.1	1185.5	0.01
3.96	2537.0	-22.8	742.8	3279.8	4.42	2011.3	1268.5	-0.01
4.43	2693.6	-68.5	788.5	3482.1	4.42	2135.3	1346.8	-0.03
4.98	2872.5	-127.9	847.9	3720.4	4.39	2284.1	1436.2	-0.04
5.52	3034.3	-196.4	916.4	3950.6	4.31	2433.5	1517.1	-0.06
6.14	3184.2	-264.9	984.9	4169.0	4.23	2576.9	1592.1	-0.08
6.91	3370.3	-347.0	1067.0	4437.4	4.16	2752.2	1685.2	-0.10
7.68	3585.4	-429.2	1149.2	4734.6	4.12	2941.9	1792.7	-0.12
8.47	3749.2	-506.9	1226.9	4976.0	4.06	3101.5	1874.6	-0.14
9.40	3928.2	-584.5	1304.5	5232.7	4.01	3268.6	1964.1	-0.15
10.34	4067.2	-662.1	1382.1	5449.4	3.94	3415.7	2033.6	-0.16
10.99	4174.5	-707.8	1427.8	5602.3	3.92	3515.0	2087.2	-0.17
11.48	4332.4	-744.3	1464.3	5796.7	3.96	3630.5	2166.2	-0.17
12.11	4433.0	-771.7	1491.7	5924.7	3.97	3708.2	2216.5	-0.17
12.90	4554.0	-826.5	1546.5	6100.5	3.94	3823.5	2277.0	-0.18
14.16	4703.7	-908.7	1628.7	6332.4	3.89	3980.6	2351.9	-0.19
15.74	4869.0	-995.5	1715.5	6584.5	3.84	4150.0	2434.5	-0.20
17.31	5093.5	-1073.1	1793.1	6886.6	3.84	4339.8	2546.7	-0.21
18.22	5204.8	-1118.8	1838.8	7043.6	3.83	4441.2	2602.4	-0.21

12/22/98

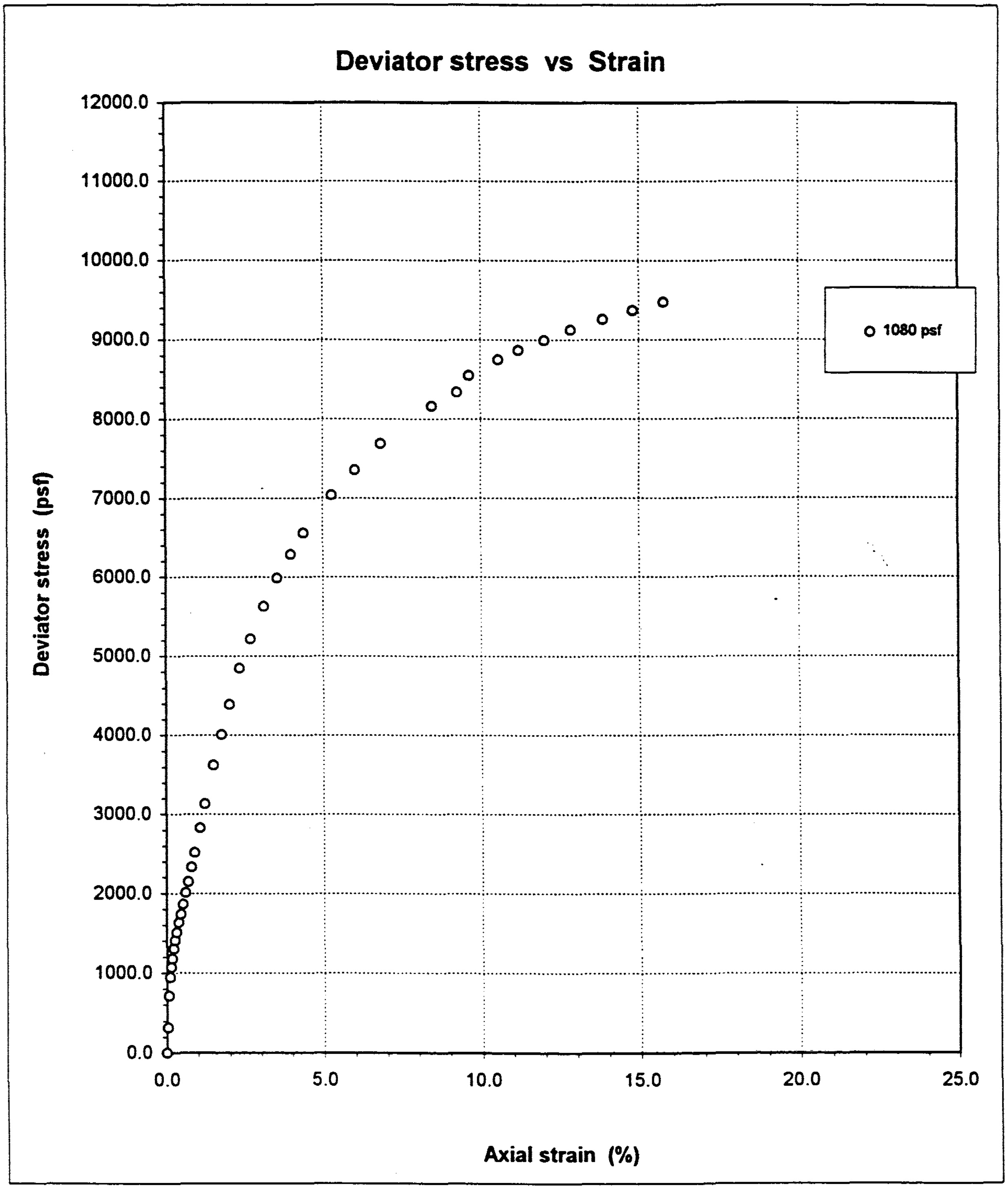
CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 10
SAMPLE NUMBER: S- 1
DEPTH (ft.): 6-8
SOIL TYPE: (CL) Dark brown sandy clay, tr. f. gravel

Dessicated Crust: Undrained shear strength may be unrealistically high
c = 479 psf
ϕ' = 33.4 deg.



TXCUPP

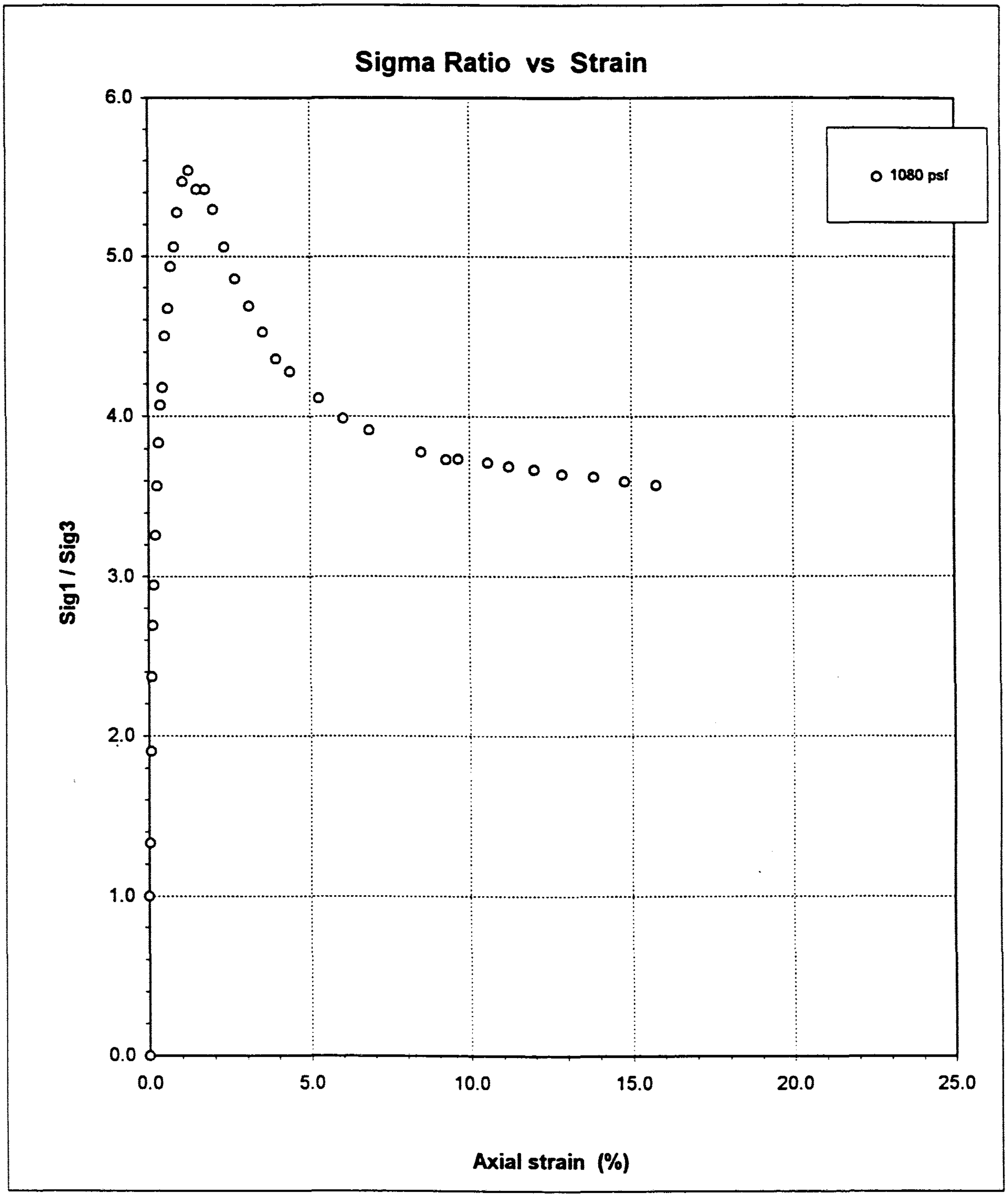
CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 10
SAMPLE NUMBER: S- 1
DEPTH (ft.): 6-8
SOIL TYPE: (CL) Dark brown sandy clay, tr. f. gravel



Signet Testing labs, Inc. 12/22/98 Page ______ of ______

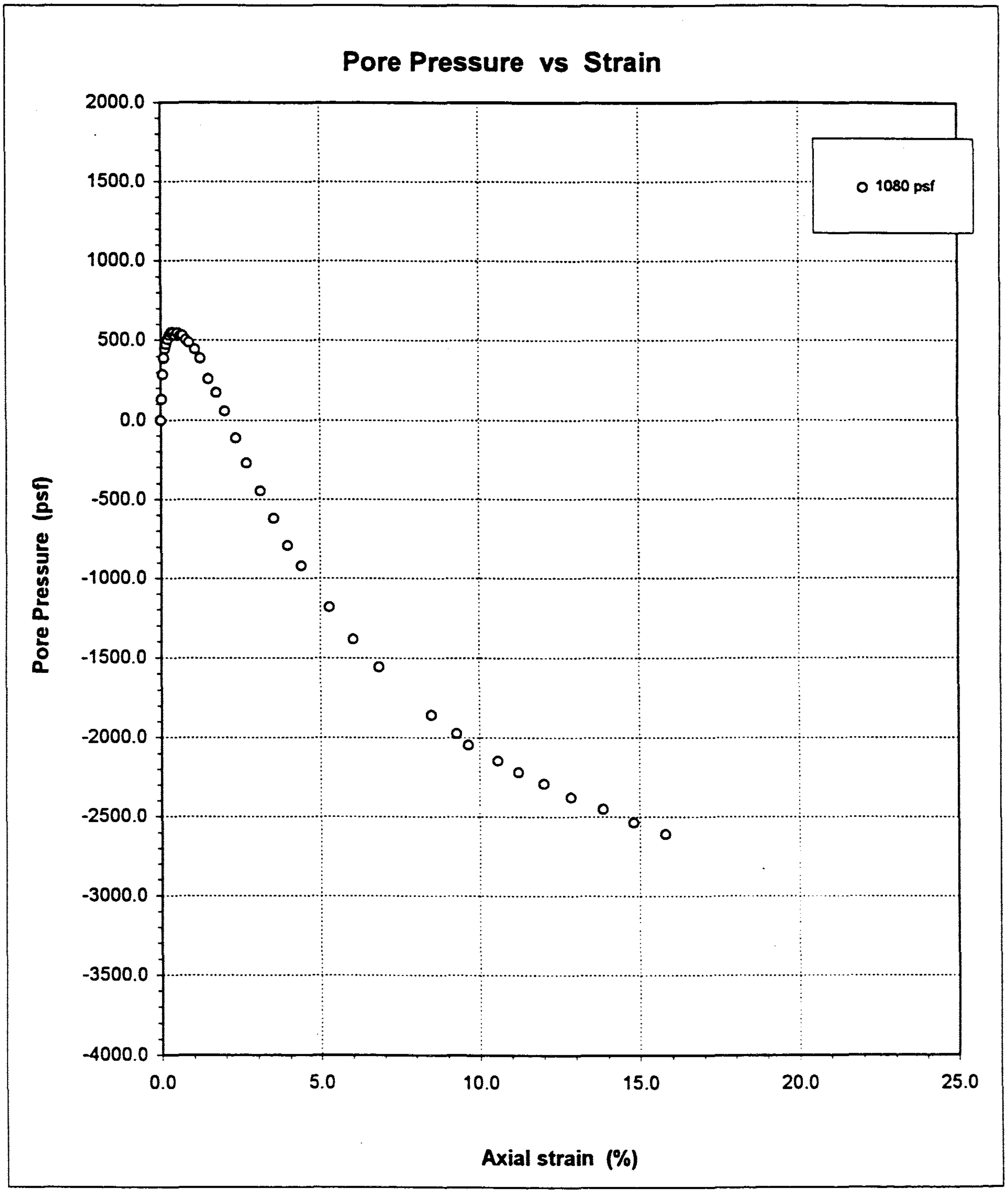
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 10
SAMPLE NUMBER: S- 1
DEPTH (ft.): 6-8
SOIL TYPE: (CL) Dark brown sandy clay, tr. f. gravel



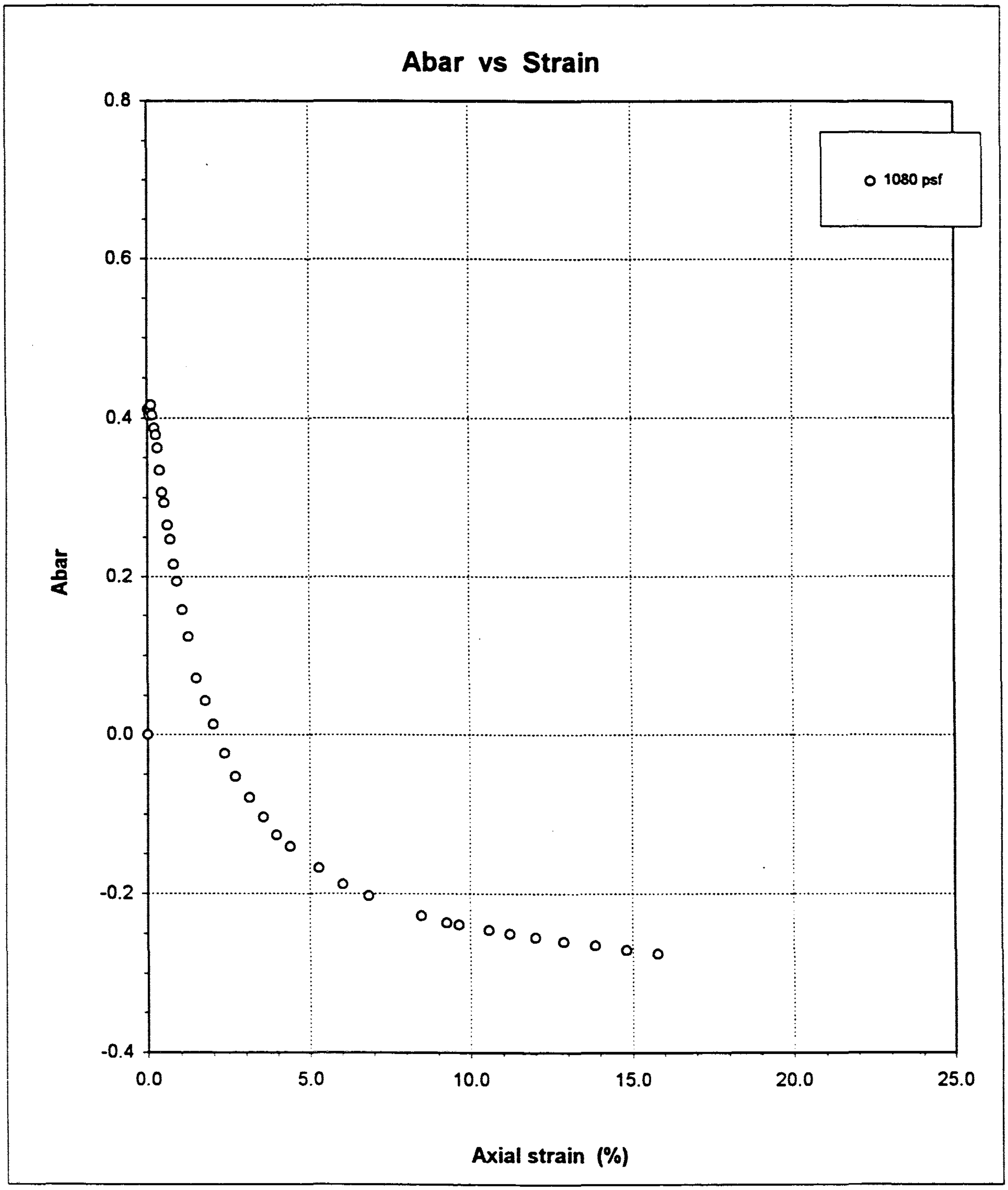
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 10
SAMPLE NUMBER: S- 1
DEPTH (ft.): 6-8
SOIL TYPE: (CL) Dark brown sandy clay, tr. f. gravel



TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 10
SAMPLE NUMBER: S- 1
DEPTH (ft.): 6-8
SOIL TYPE: (CL) Dark brown sandy clay, tr. f. gravel



TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 10
SAMPLE NUMBER: S- 1
DEPTH (ft.): 6-8
SOIL TYPE: (CL) Dark brown sandy clay, tr. f. gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	1408.0	1432.4	
HEIGHT(in.) =	5.860	5.860	
AREA(sq.in.) =	6.535	6.535	
VOLUME(c.c.) =	627.56	627.56	
WET DENSITY (Pcf) =	140.0	142.4	
DRY DENSITY (Pcf) =	125.9	125.9	
MOISTURE (%) =	11.2	13.1	
Gs (Assumed) =	2.70		
VOID RATIO =	0.338	0.338	
% SATURATION =	89.4	104.8	

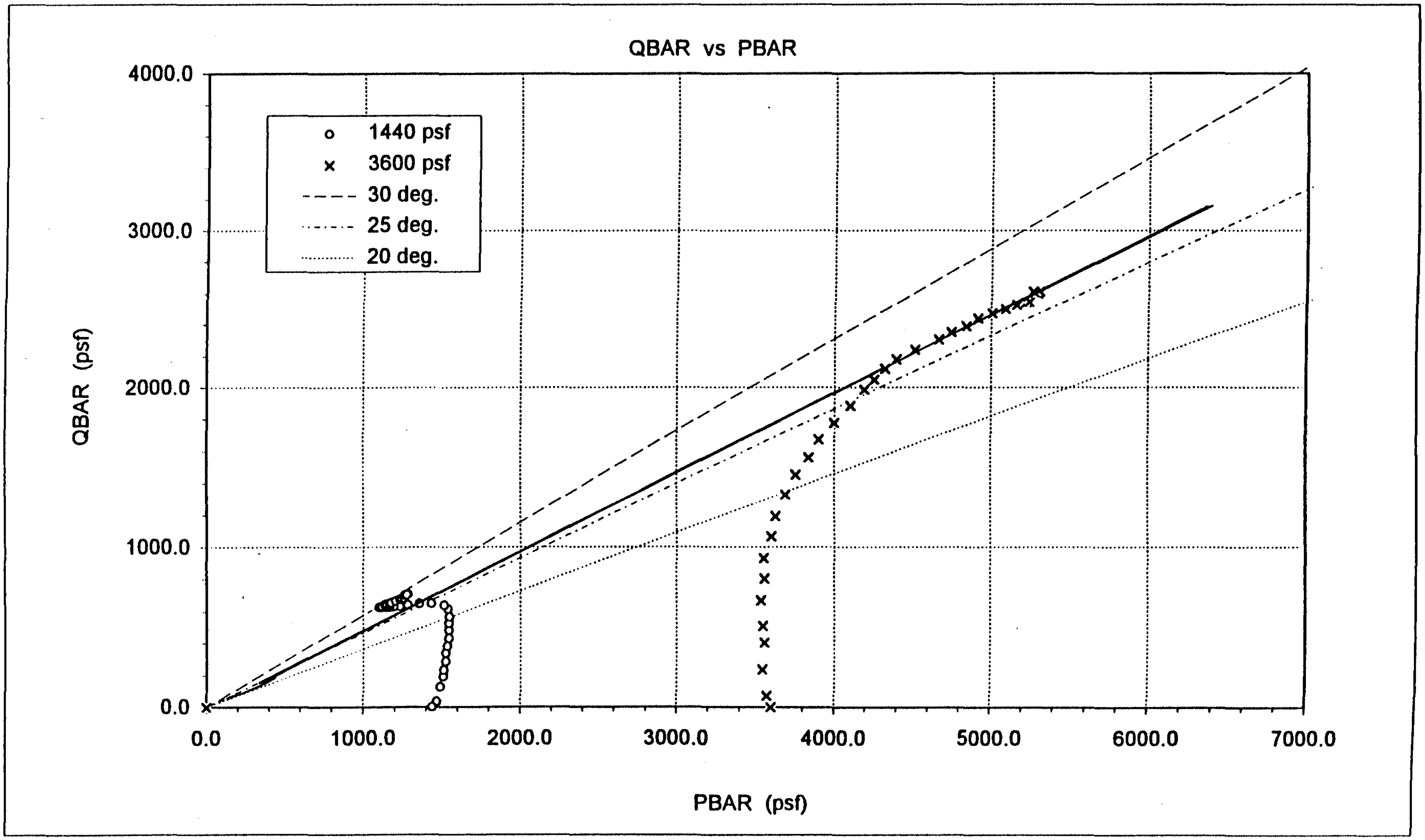
DATA REDUCTIONS:

LOAD FACTOR = 9.55
DISPL. FACTOR = 0.001
P.W.P. FACTOR = 1.0
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 1080 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	1080.0	1080.0	1.00	1080.0	0.0	0.00
0.03	315.6	129.6	950.4	1266.0	1.33	1108.2	157.8	0.41
0.06	715.0	288.0	792.0	1507.0	1.90	1149.5	357.5	0.40
0.09	946.1	388.8	691.2	1637.3	2.37	1164.2	473.0	0.41
0.13	1071.8	446.4	633.6	1705.4	2.69	1169.5	535.9	0.42
0.16	1176.5	475.2	604.8	1781.3	2.95	1193.1	588.3	0.40
0.21	1301.9	504.0	576.0	1877.9	3.26	1226.9	650.9	0.39
0.26	1406.2	532.8	547.2	1953.4	3.57	1250.3	703.1	0.38
0.32	1510.3	547.2	532.8	2043.1	3.83	1288.0	755.2	0.36
0.38	1635.1	547.2	532.8	2167.9	4.07	1350.3	817.5	0.33
0.45	1738.7	532.8	547.2	2285.9	4.18	1416.5	869.3	0.31
0.52	1863.1	547.2	532.8	2395.9	4.50	1464.3	931.5	0.29
0.61	2007.9	532.8	547.2	2555.1	4.67	1551.2	1004.0	0.27
0.69	2152.5	532.8	547.2	2699.7	4.93	1623.4	1076.2	0.25
0.79	2338.1	504.0	576.0	2914.1	5.06	1745.1	1169.1	0.22
0.90	2523.4	489.6	590.4	3113.8	5.27	1852.1	1261.7	0.19
1.07	2831.3	446.4	633.6	3464.9	5.47	2049.3	1415.7	0.16
1.24	3138.2	388.8	691.2	3829.4	5.54	2260.3	1569.1	0.12
1.49	3627.6	259.2	820.8	4448.4	5.42	2634.6	1813.8	0.07
1.75	4011.0	172.8	907.2	4918.2	5,42	2912.7	2005.5	0.04
2.01	4392.3	57.6	1022.4	5414.7	5.30	3218.6	2196.2	0.01
2.35	4849.7	-115.2	1195.2	6044.9	5.06	3620.0	2424.8	-0.02
2.69	5221.8	-273.6	1353.6	6575.4	4.86	3964.5	2610.9	-0.05
3.11	5627.0	-446.4	1526.4	7153.4	4.69	4339.9	2813.5	-0.08
3.54	5987.9	-619.2	1699.2	7687.1	4.52	4693.2	2994.0	-0.10
3.97	6284.8	-792.0	1872.0	8156.8	4.36	5014.4	3142.4	-0.13
4.39	6558.6	-921.6	2001.6	8560.2	4.28	5280.9	3279.3	-0.14
5.28	7035.9	-1180.8	2260.8	9296.7	4.11	5778.8	3518.0	-0.17
6.03	7355.8	-1382.4	2462.4	9818.2	3.99	6140.3	3677.9	-0.19
6.85	7683.7	-1555.2	2635.2	10318.9	3.92	6477.1	3841.9	-0.20
8.49	8164.8	-1857.6	2937.6	11102.4	3.78	7020.0	4082.4	-0.23
9.27	8343.0	-1972.8	3052.8	11395.8	3.73	7224.3	4171.5	-0.24
9.65	8555.6	-2044.8	3124.8	11680.4	3.74	7402.6	4277.8	-0.24
10.57	8750.6	-2145.6	3225.6	11976.2	3.71	7600.9	4375.3	-0.25
11.22	8874.0	-2217.6	3297.6	12171.6	3.69	7734.6	4437.0	-0.25
12.02	8997.5	-2289.6	3369.6	12367.1	3.67	7868.3	4498.7	-0.25
12.88	9130.2	-2376.0	3456.0	12586.2	3.64	8021.1	4565.1	-0.26
13.87	9262.1	-2448.0	3528.0	12790.1	3.63	8159.1	4631.1	-0.26
14.80	9376.3	-2534.4	3614.4	12990.7	3.59	8302.6	4688.2	-0.27
15.78	9482.0	-2606.4	3686.4	13168.4	3.57	8427.4	4741.0	-0.27

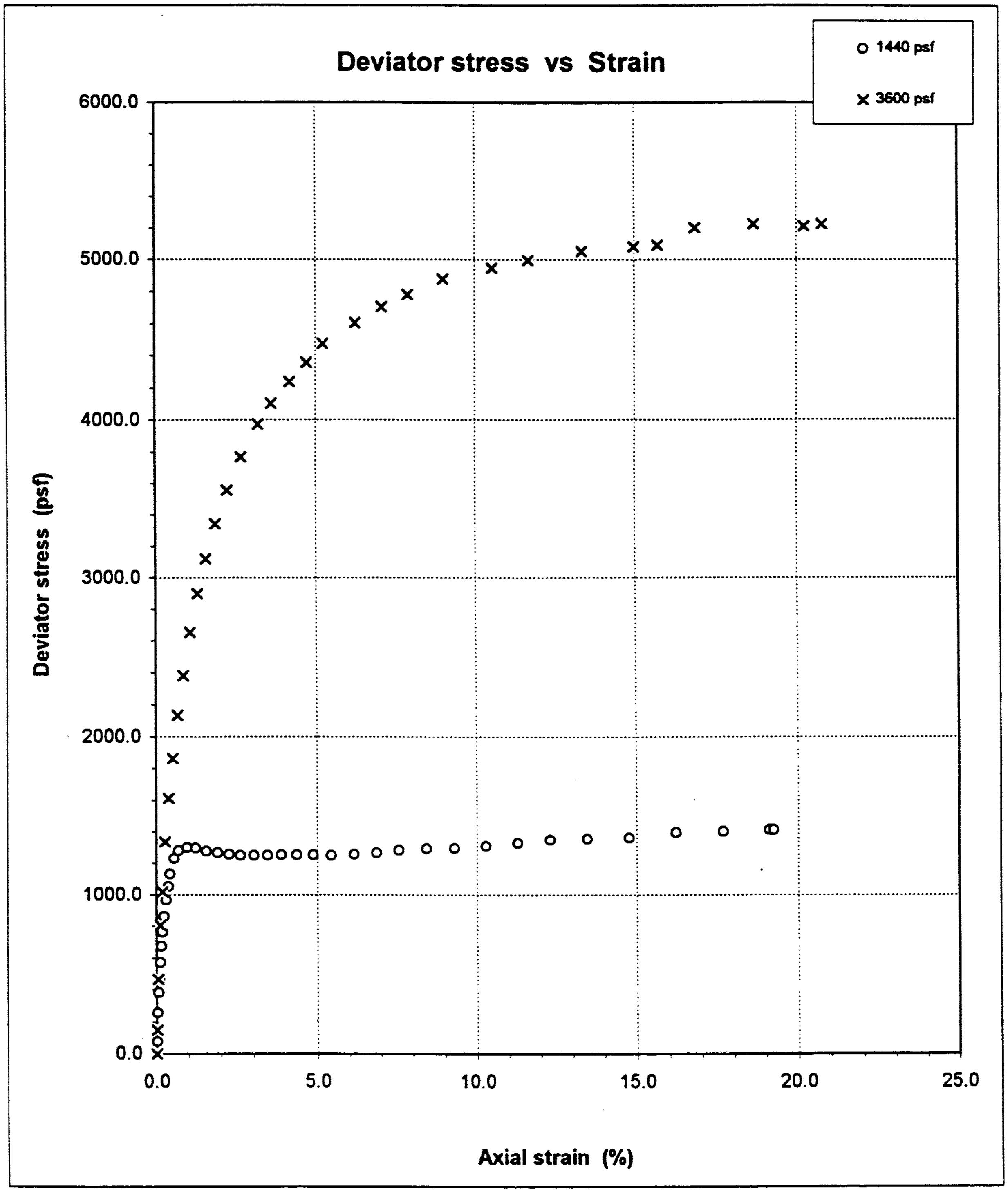
CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 10
SAMPLE NUMBER: S - 3
DEPTH (ft.): 13.5 - 15
SOIL TYPE: (CL/CH) Brown clay, tr. occ. gravel

These two tests do not seem to be of same material
c = 0 psf
ϕ' = 29.7 deg.



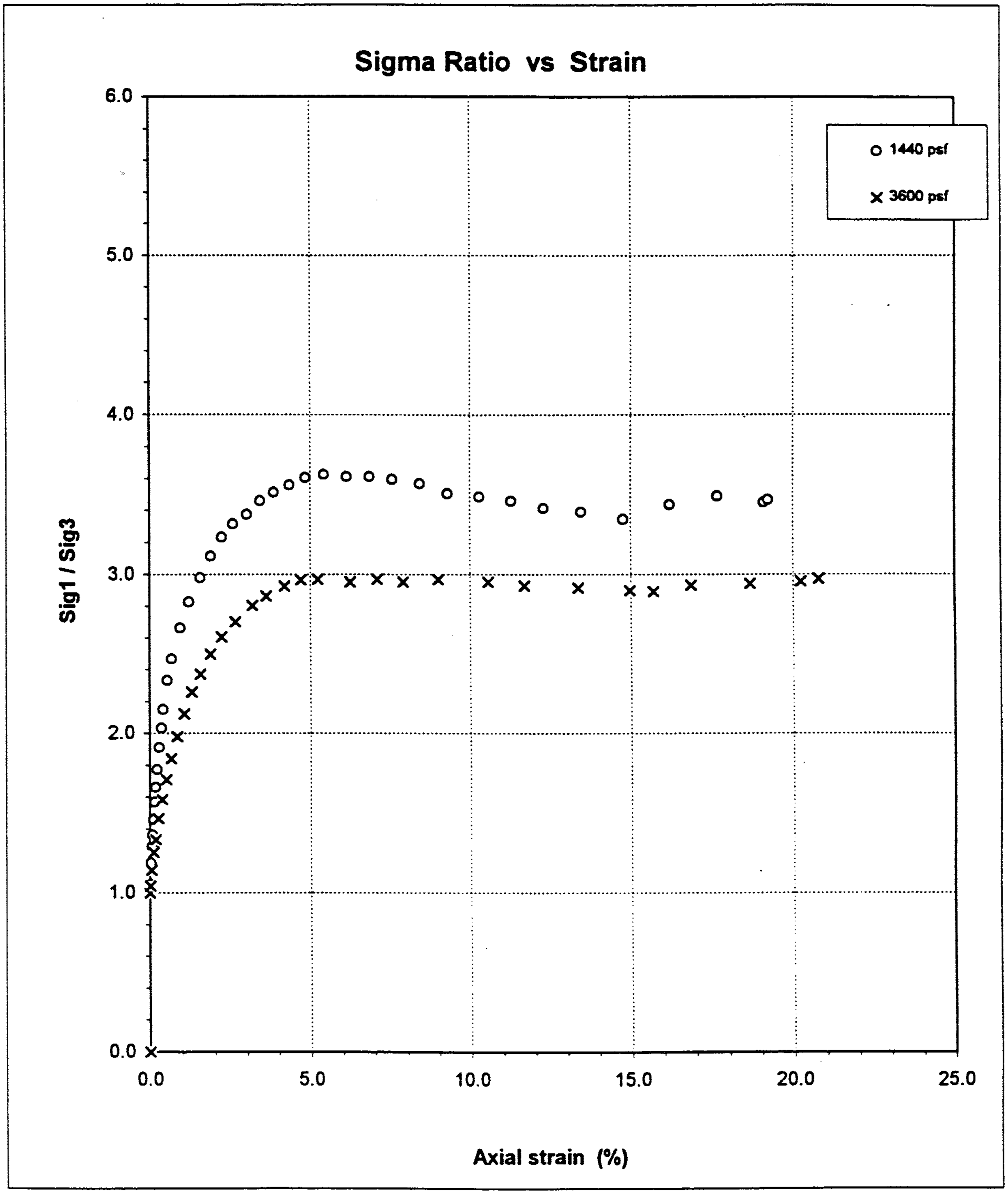
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 10
SAMPLE NUMBER: S - 3
DEPTH (ft.): 13.5 - 15
SOIL TYPE: (CL/CH) Brown clay, tr. occ. gravel



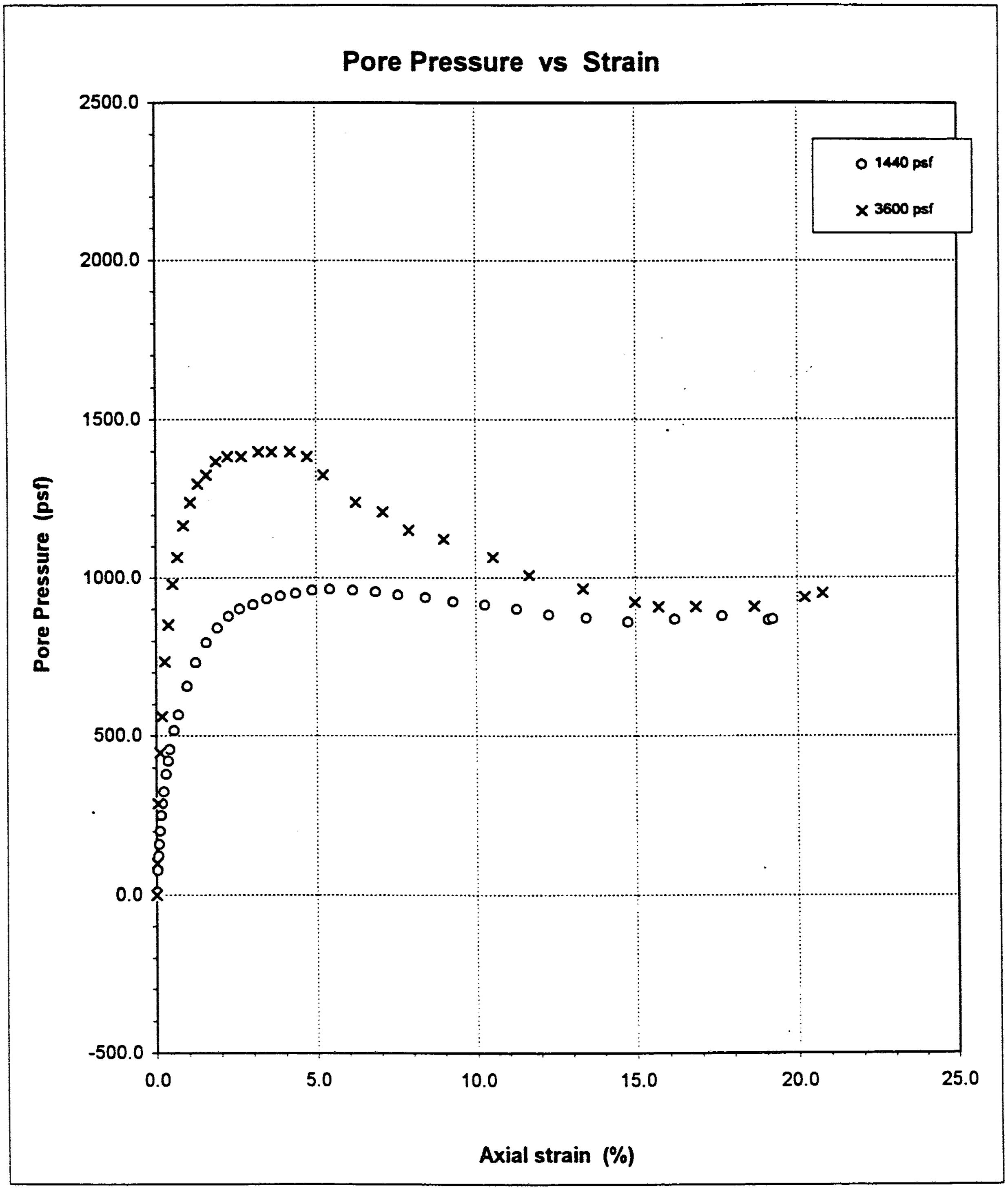
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 10
SAMPLE NUMBER: S - 3
DEPTH (ft.): 13.5 - 15
SOIL TYPE: (CL/CH) Brown clay, tr. occ. gravel



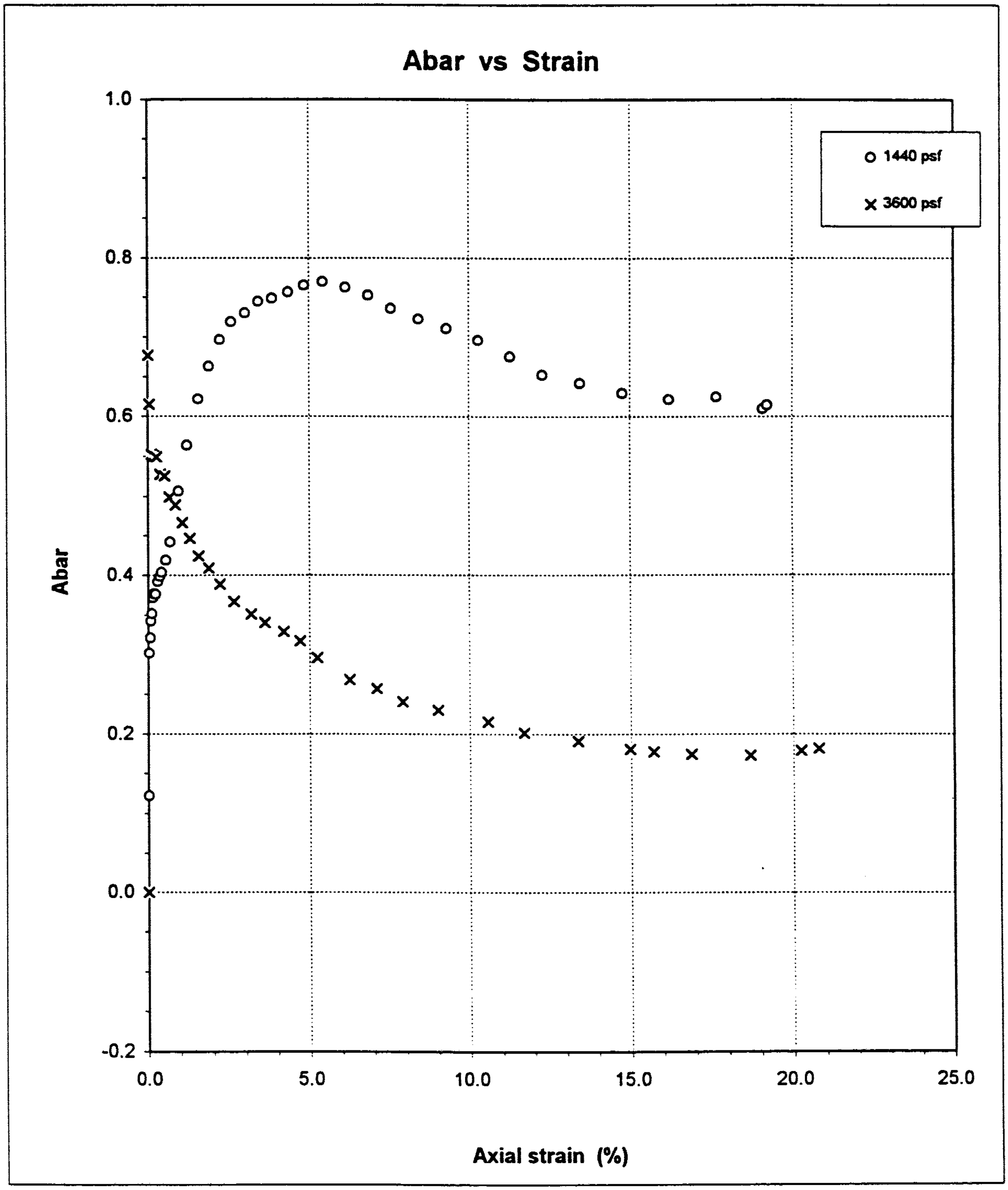
TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 10
SAMPLE NUMBER: S - 3
DEPTH (ft.): 13.5 - 15
SOIL TYPE: (CL/CH) Brown clay, tr. occ. gravel



TXCUPP

CLIENT/PROJECT: Thompson Creek
BORING NUMBER: DH - 10
SAMPLE NUMBER: S - 3
DEPTH (ft.): 13.5 - 15
SOIL TYPE: (CL/CH) Brown clay, tr. occ. gravel



TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 10
SAMPLE NUMBER: S - 3
DEPTH (ft.): 13.5 - 15
SOIL TYPE: (CL/CH) Brown clay, tr. occ. gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	1180.1	1230.7	
HEIGHT(in.) =	6.000	5.978	
AREA(sq.in.) =	6.481	6.459	
VOLUME(c.c.) =	637.21	632.71	
WET DENSITY (Pcf) =	115.6	121.4	
DRY DENSITY (Pcf) =	93.8	94.5	
MOISTURE (%) =	23.2	28.4	
Gs (Assumed) =	2.70		
VOID RATIO =	0.796	0.783	
% SATURATION =	78.6	98.1	

DATA REDUCTIONS:

LOAD FACTOR = 0.1238589
DISPL. FACTOR = 0.0002997
P.W.P. FACTOR = 0.031711
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 1440 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	1440.0	1440.0	1.00	1440.0	0.0	0.00
0.01	74.6	9.1	1430.9	1505.4	1.05	1468.1	37.3	0.12
0.04	256.7	77.6	1362.4	1619.1	1.19	1490.7	128.4	0.30
0.06	383.6	123.3	1316.7	1700.3	1.29	1508.5	191.8	0.32
0.08	466.3	159.8	1280.2	1746.5	1.36	1513.3	233.2	0.34
0.11	571.0	200.9	1239.1	1810.1	1.46	1524.6	285.5	0.35
0.15	675.6	251.2	1188.8	1864.4	1.57	1526.6	337.8	0.37
0.18	763.5	287.7	1152.3	1915.9	1.66	1534.1	381.8	0.38
0.24	862.3	324.2	1115.8	1978.1	1.77	1546.9	431.2	0.38
0.30	966.4	379.0	1061.0	2027.4	1.91	1544.2	483.2	0.39
0.36	1053.8	420.1	1019.9	2073.7	2.03	1546.8	526.9	0.40
0.42	1130.2	456.6	983.4	2113.5	2.15	1548.4	565.1	0.40
0.55	1230.3	516.0	924.0	2154.3	2.33	1539.1	615.2	0.42
0.68	1280.8	566.2	873.8	2154.6	2.47	1514.2	640.4	0.44
0.95	1299.3	657.6	782.4	2081.7	2.66	1432.1	649.6	0.51
1.21	1295.8	730.6	709.4	2005.2	2.83	1357.3	647.9	0.56
1.55	1277.7	794.6	645.4	1923.2	2.98	1284.3	638.9	0.62
1.90	1267.9	840.2	599.8	1867.6	3.11	1233.7	633.9	0.66
2.25	1257.9	876.8	563.2	1821.2	3.23	1192.2	629.0	0.70
2.59	1250.8	899.6	540.4	1791.2	3.31	1165.8	625.4	0.72
3.01	1250.7	913.3	526.7	1777.5	3.37	1152.1	625.4	0.73
3.44	1250.6	931.6	508.4	1759.0	3.46	1133.7	625.3	0.74
3.87	1255.7	940.7	499.3	1755.0	3.51	1127.2	627.8	0.75
4.36	1254.5	949.8	490.2	1744.7	3.56	1117.4	627.2	0.76
4.86	1253.2	958.9	481.1	1734.2	3.61	1107.6	626.6	0.77
5.43	1250.9	963.5	476.5	1727.3	3.63	1101.9	625.4	0.77
6.15	1257.0	958.9	481.1	1738.0	3.61	1109.5	628.5	0.76
6.86	1268.0	954.4	485.6	1753.6	3.61	1119.6	634.0	0.75
7.57	1283.9	945.3	494.7	1778.6	3.59	1136.7	641.9	0.74
8.43	1294.6	936.1	503.9	1798.5	3.57	1151.2	647.3	0.72
9.29	1297.5	922.4	517.6	1815.1	3.51	1166.3	648.7	0.71
10.29	1310.5	913.3	526.7	1837.2	3.49	1182.0	655.3	0.70
11.29	1330.2	899.6	540.4	1870.6	3.46	1205.5	665.1	0.68
12.30	1349.0	881.3	558.7	1907.7	3.41	1233.2	674.5	0.65
13.47	1357.3	872.2	567.8	1925.1	3.39	1246.5	678.6	0.64
14.76	1362.8	858.5	581.5	1944.3	3.34	1262.9	681.4	0.63
16.21	1395.2	867.6	572.4	1967.6	3.44	1270.0	697.6	0.62
17.68	1402.6	876.8	563.2	1965.9	3.49	1264.6	701.3	0.63
19.10	1414.1	863.1	576.9	1991.1	3.45	1284.0	707.1	0.61
19.23	1411.8	867.6	572.4	1984.2	3.47	1278.3	705.9	0.61

TYPE OF TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 10
SAMPLE NUMBER: S - 3
DEPTH (ft.): 13.5 - 15
SOIL TYPE: (CL/CH) Brown clay, tr. occ. gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	1249.2	1253.8	
HEIGHT(in.) =	5.740	5.705	
AREA(sq.in.) =	6.517	6.462	
VOLUME(c.c.) =	613.00	604.15	
WET DENSITY (Pcf) =	127.2	129.5	
DRY DENSITY (Pcf) =	103.7	105.2	
MOISTURE (%) =	22.7	23.1	
Gs (Assumed) =	2.70		
VOID RATIO =	0.625	0.602	
% SATURATION =	97.9	103.8	

DATA REDUCTIONS:

LOAD FACTOR = 9.55
DISPL. FACTOR = 0.001
P.W.P. FACTOR = 1.0
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 3600 Psf

STRAIN (%)	DEVIATOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	3600.0	3600.0	1.00	3600.0	0.0	0.00
0.02	148.9	100.8	3499.2	3648.1	1.04	3573.7	74.5	0.68
0.05	467.9	288.0	3312.0	3779.9	1.14	3546.0	234.0	0.62
0.11	807.7	446.4	3153.6	3961.3	1.26	3557.5	403.9	0.55
0.18	1019.7	561.6	3038.4	4058.1	1.34	3548.2	509.8	0.55
0.27	1337.1	734.4	2865.6	4202.7	1.47	3534.1	668.5	0.55
0.38	1611.2	849.6	2750.4	4361.6	1.59	3556.0	805.6	0.53
0.51	1863.1	979.2	2620.8	4483.9	1.71	3552.4	931.6	0.53
0.67	2135.0	1065.6	2534.4	4669.4	1.84	3601.9	1067.5	0.50
0.85	2384.2	1166.4	2433.6	4817.8	1.98	3625.7	1192.1	0.49
1.07	2652.6	1238.4	2361.6	5014.2	2.12	3687.9	1326.3	0.47
1.30	2898.6	1296.0	2304.0	5202.6	2.26	3753.3	1449.3	0.45
1.56	3121.3	1324.8	2275.2	5396.5	2.37	3835.8	1560.6	0.42
1.87	3341.3	1368.0	2232.0	5573.3	2.50	3902.6	1670.6	0.41
2.23	3557.9	1382.4	2217.6	5775.5	2.60	3996.6	1779.0	0.39
2.66	3770.1	1382.4	2217.6	5987.7	2.70	4102.7	1885.1	0.37
3.19	3976.1	1396.8	2203.2	6179.3	2.80	4191.2	1988.0	0.35
3.61	4102.4	1396.8	2203.2	6305.6	2.86	4254.4	2051.2	0.34
4.19	4240.9	1396.8	2203.2	6444.1	2.92	4323.6	2120.4	0.33
4.72	4359.5	1382.4	2217.6	6577.1	2.97	4397.4	2179.8	0.32
5.24	4476.6	1324.8	2275.2	6751.8	2.97	4513.5	2238.3	0.30
6.26	4608.1	1238.4	2361.6	6969.7	2.95	4665.7	2304.1	0.27
7.10	4705.1	1209.6	2390.4	7095.5	2.97	4743.0	2352.6	0.26
7.91	4781.9	1152.0	2448.0	7229.9	2.95	4838.9	2390.9	0.24
9.01	4879.5	1123.2	2476.8	7356.3	2.97	4916.5	2439.7	0.23
10.55	4949.0	1065.6	2534.4	7483.4	2.95	5008.9	2474.5	0.22
11.69	4998.7	1008.0	2592.0	7590.7	2.93	5091.4	2499.4	0.20
13.36	5052.0	964.8	2635.2	7687.2	2.92	5161.2	2526.0	0.19
14.97	5084.6	921.6	2678.4	7763.0	2.90	5220.7	2542.3	0.18
15.71	5094.4	907.2	2692.8	7787.2	2.89	5240.0	2547.2	0.18
16.86	5201.4	907.2	2692.8	7894.2	2.93	5293.5	2600.7	0.17
18.67	5226.9	907.2	2692.8	7919.7	2.94	5306.3	2613.5	0.17
20.23	5211.5	936.0	2664.0	7875.5	2.96	5269.8	2605.8	0.18
20.77	5226.6	950.4	2649.6	7876.2	2.97	5262.9	2613.3	0.18

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: --
SAMPLE NUMBER: --
DEPTH (ft.): --
SOIL TYPE: (CL)

c=0
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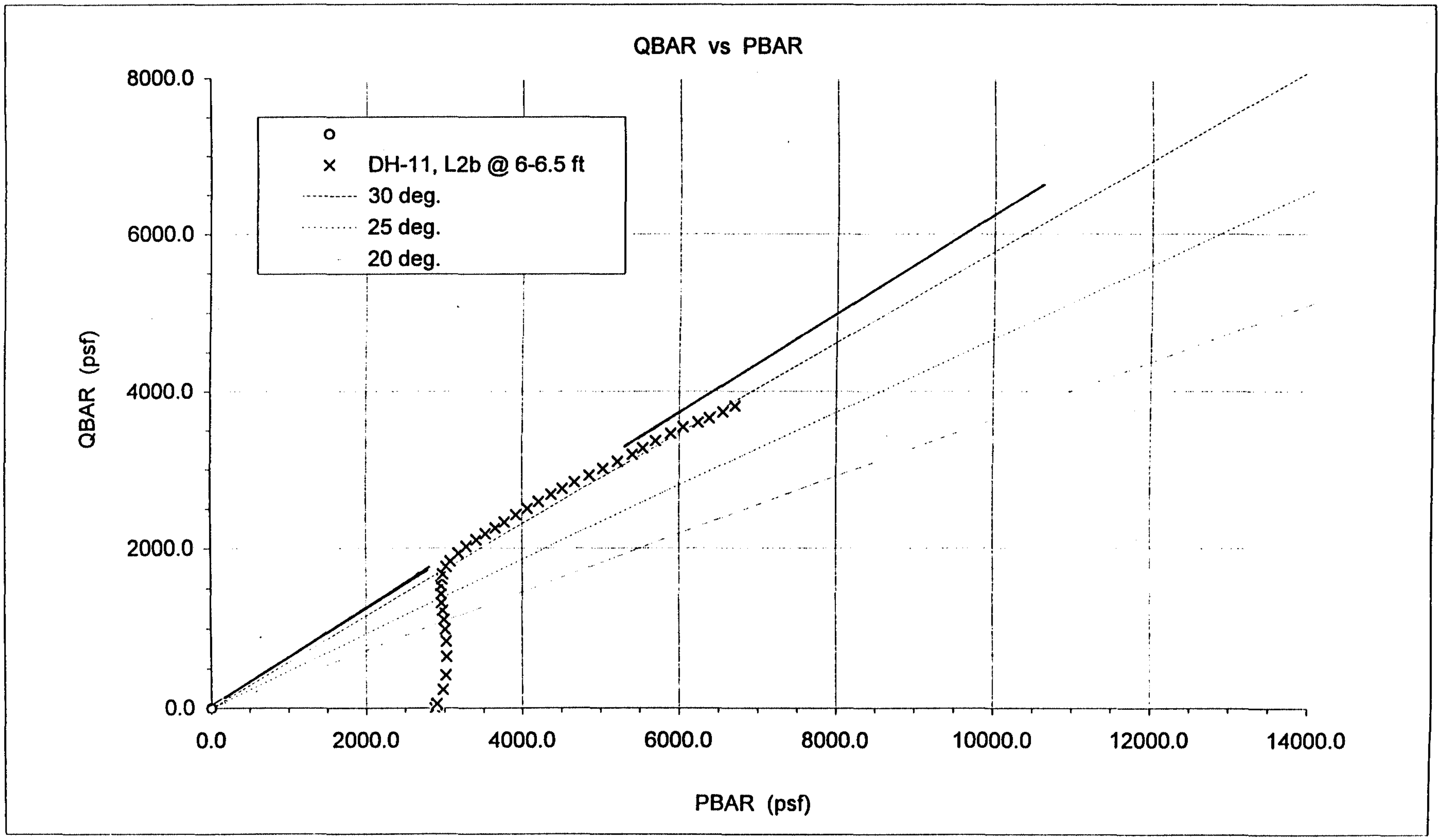
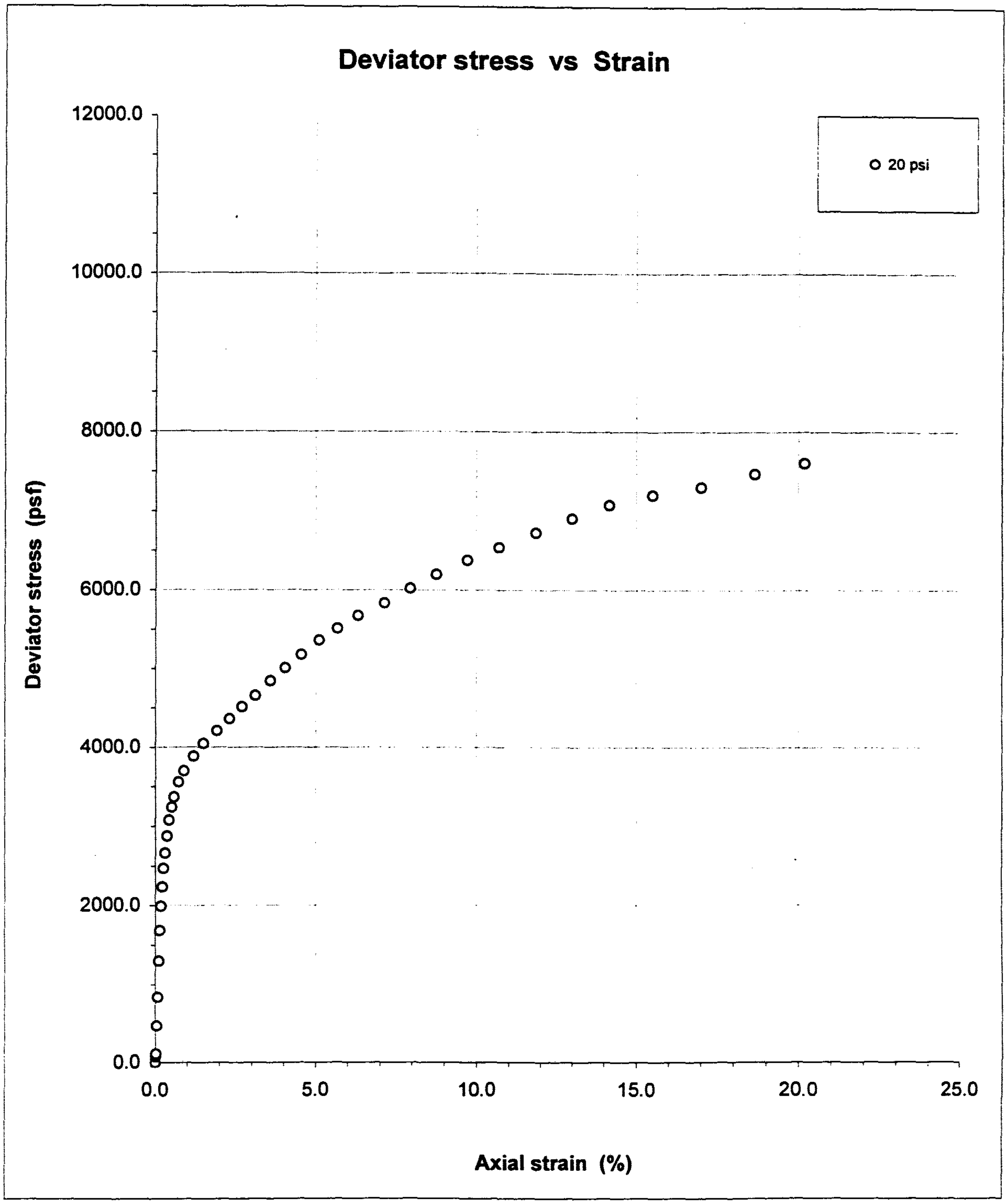


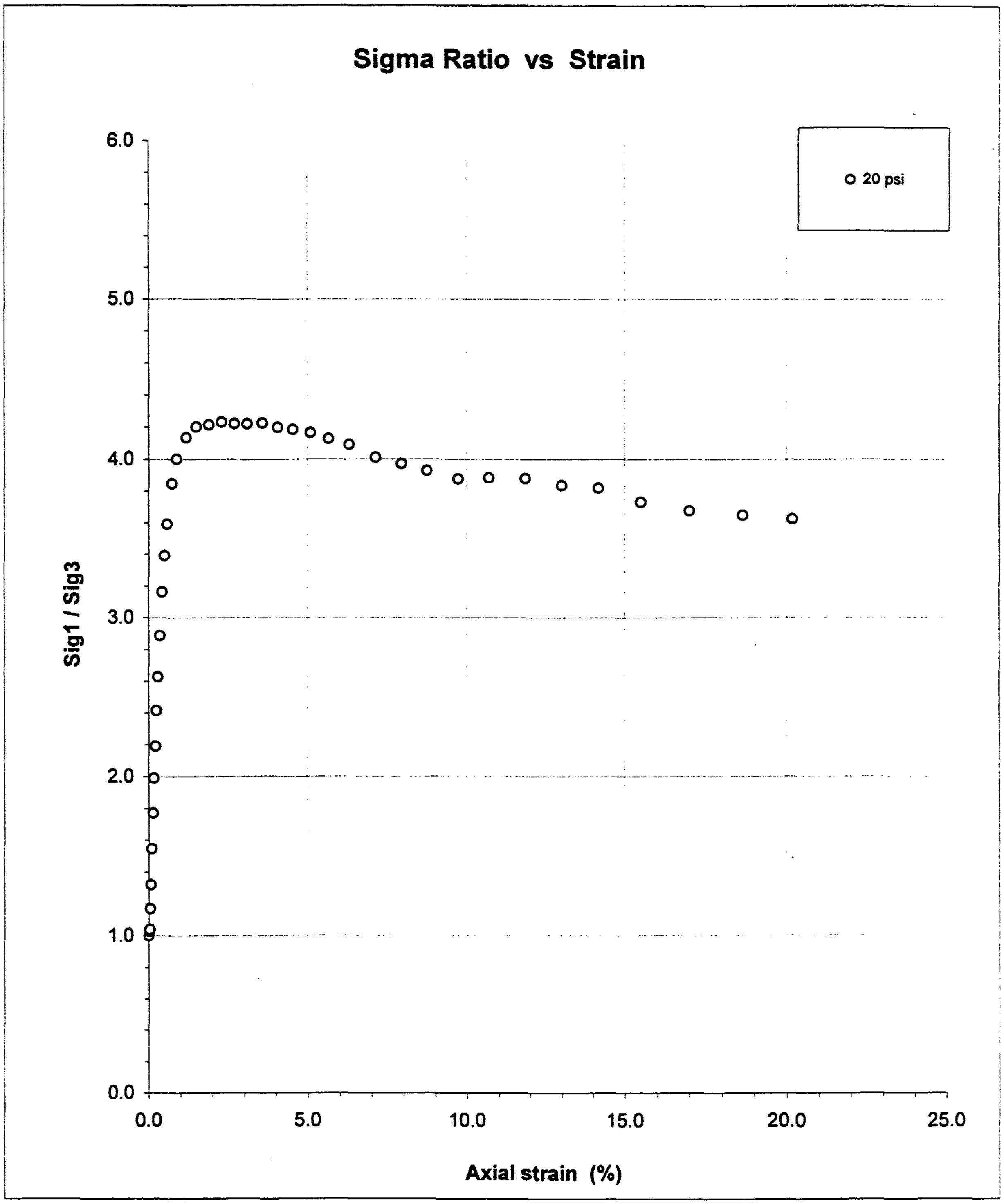
TXCUPP

JOB NUMBER: Thompson Creek
BORING NUMBER: DH - 11
SAMPLE NUMBER: L2b
DEPTH (ft.): 6 - 6.5
SOIL TYPE: (CL) Dark brown clay w/ few f. gravel



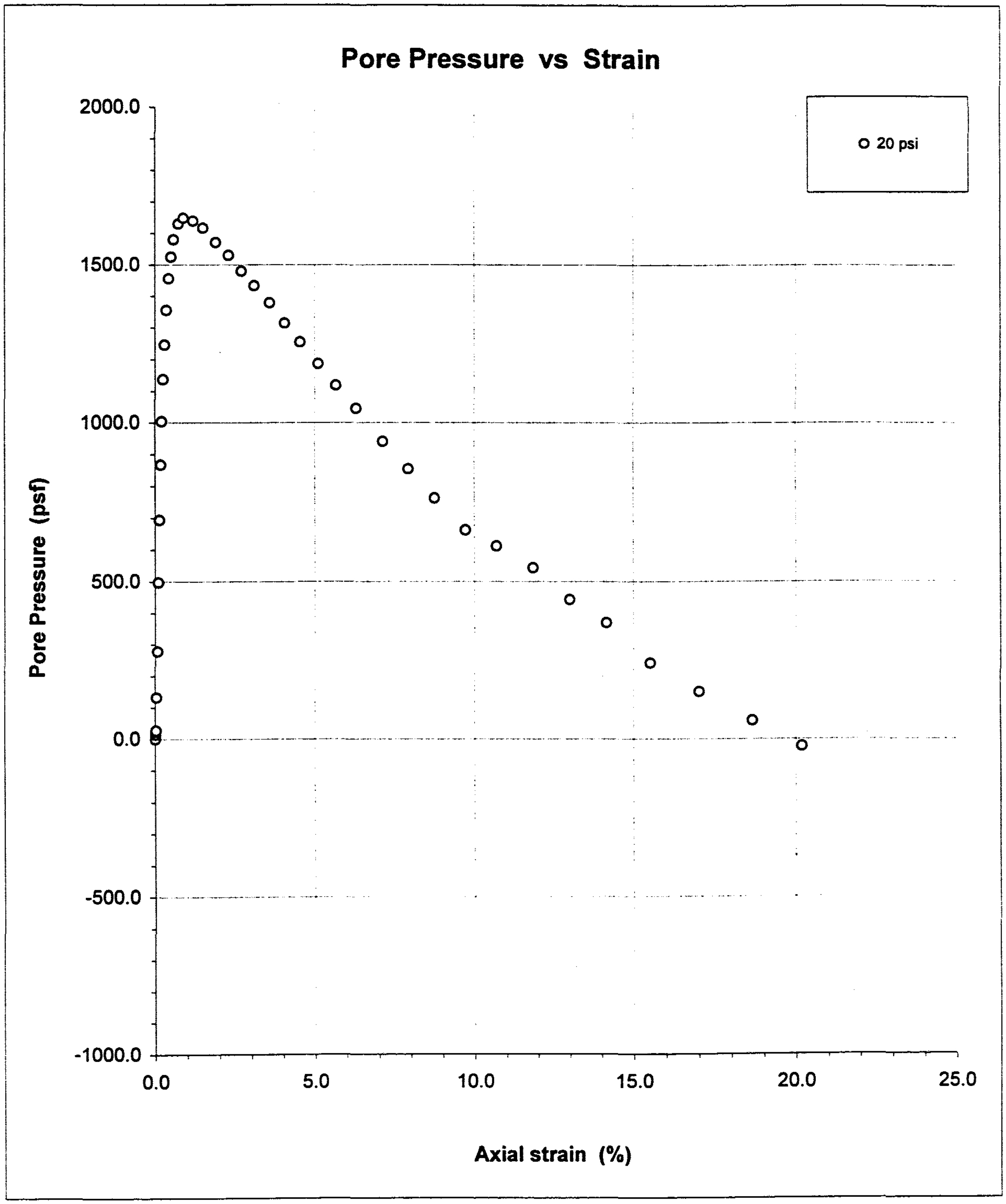
TXCUPP

JOB NUMBER: Thompson Creek
BORING NUMBER: DH - 11
SAMPLE NUMBER: L2b
DEPTH (ft.): 6 - 6.5
SOIL TYPE: (CL) Dark brown clay w/ few f. gravel



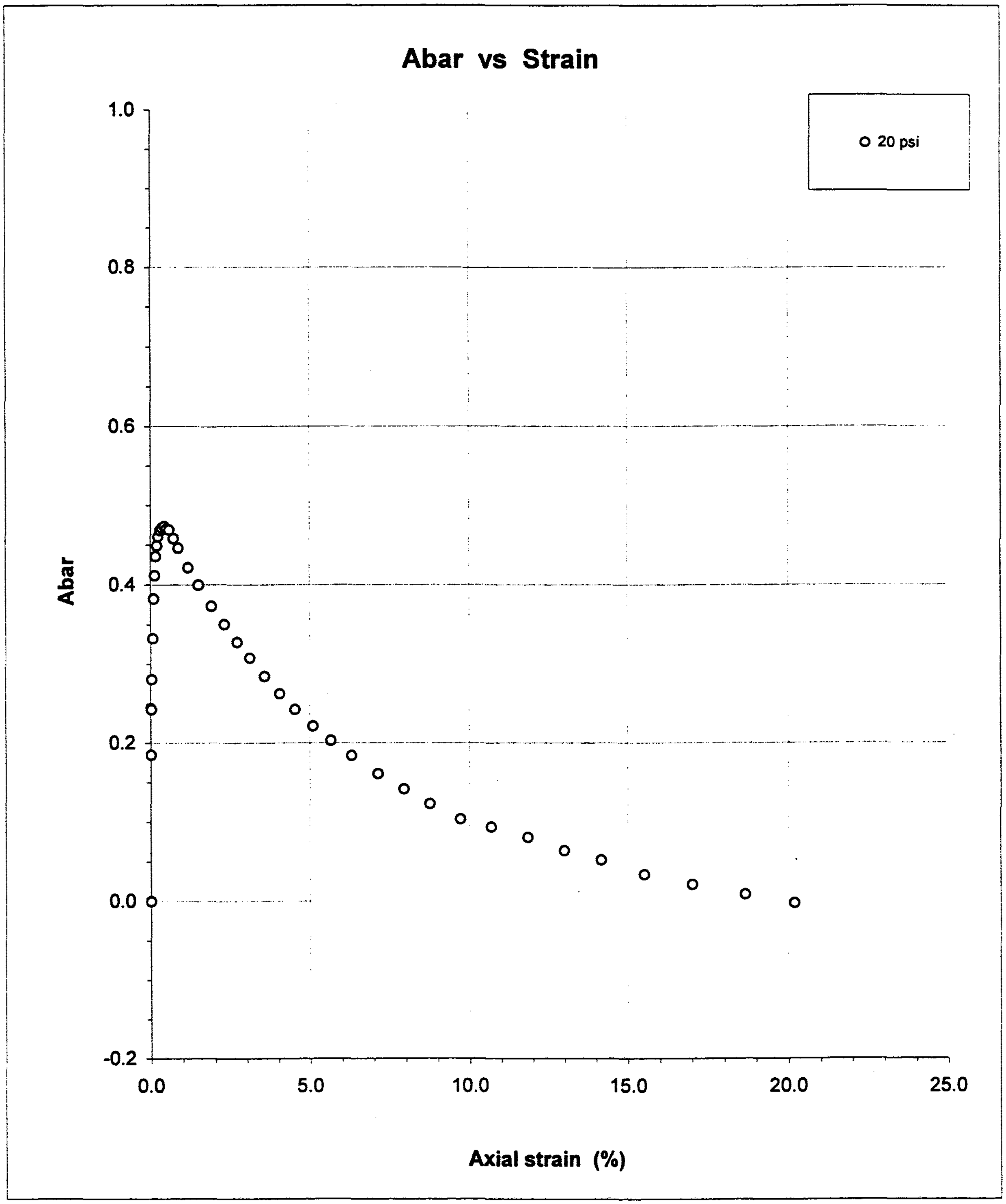
TXCUPP

JOB NUMBER: Thompson Creek
BORING NUMBER: DH - 11
SAMPLE NUMBER: L2b
DEPTH (ft.): 6 - 6.5
SOIL TYPE: (CL) Dark brown clay w/ few f. gravel



TXCUPP

JOB NUMBER: Thompson Creek
BORING NUMBER: DH - 11
SAMPLE NUMBER: L2b
DEPTH (ft.): 6 - 6.5
SOIL TYPE: (CL) Dark brown clay w/ few f. gravel



TYPE TEST - TX/CU/PP

CLIENT/PROJECT: Thompson Creek
JOB NUMBER: --
BORING NUMBER: DH - 11
SAMPLE NUMBER: L2b
DEPTH (ft.): 6 - 6.5
SOIL TYPE: (CL) Dark brown clay w/ few f. gravel

MOISTURE & DENSITY:

	INITIAL	FINAL	Trimmings
WEIGHT(gms) =	868.1	877.5	
HEIGHT(in.) =	5.280	5.251	
AREA(sq.in.) =	4.609	4.576	
VOLUME(c.c.) =	398.79	393.79	
WET DENSITY (Pcf) =	135.8	139.0	
DRY DENSITY (Pcf) =	119.9	121.5	
MOISTURE (%) =	13.3	14.5	
Gs (Assumed) =	2.70		
VOID RATIO =	0.405	0.387	
% SATURATION =	88.4	101.0	

DATA REDUCTIONS:

LOAD FACTOR = 0.1238589
DISPL. FACTOR = 0.0002997
P.W.P. FACTOR = 0.031711
RATE OF SHEARING = 0.05 in/hr.
CONFIN. PRESSURE = 2880 Psf

STRAIN (%)	DE TOR (PSF)	P.W.P. (PSF)	EFF.SIG3 (PSF)	EFF.SIG1 (PSF)	SIGMA RATIO	PBAR (PSF)	QBAR (PSF)	A
0.00	0.0	0.0	2880.0	2880.0	1.00	2880.0	0.0	0.00
0.01	74.0	13.7	2866.3	2940.3	1.03	2903.3	37.0	0.19
0.01	93.5	22.8	2857.2	2950.7	1.03	2903.9	46.8	0.24
0.03	113.0	27.4	2852.6	2965.6	1.04	2909.1	56.5	0.24
0.05	471.4	132.4	2747.6	3218.9	1.17	2983.3	235.7	0.28
0.07	837.3	278.5	2601.5	3438.8	1.32	3020.1	418.7	0.33
0.10	1300.4	497.7	2382.3	3682.7	1.55	3032.5	650.2	0.38
0.13	1685.3	694.1	2185.9	3871.2	1.77	3028.6	842.7	0.41
0.17	1992.0	867.6	2012.4	4004.4	1.99	3008.4	996.0	0.44
0.21	2236.3	1004.6	1875.4	4111.7	2.19	2993.6	1118.2	0.45
0.25	2468.7	1137.0	1743.0	4211.7	2.42	2977.3	1234.4	0.46
0.29	2661.9	1246.6	1633.4	4295.3	2.63	2964.3	1330.9	0.47
0.35	2877.7	1356.2	1523.8	4401.5	2.89	2962.6	1438.8	0.47
0.42	3077.5	1456.7	1423.3	4500.8	3.16	2962.1	1538.8	0.47
0.50	3242.0	1525.2	1354.8	4596.8	3.39	2975.8	1621.0	0.47
0.58	3367.2	1580.0	1300.0	4667.3	3.59	2983.6	1683.6	0.47
0.72	3559.5	1630.2	1249.8	4809.3	3.85	3029.6	1779.8	0.46
0.88	3696.9	1648.5	1231.5	4928.5	4.00	3080.0	1848.5	0.45
1.19	3889.5	1639.3	1240.7	5130.2	4.14	3185.4	1944.8	0.42
1.50	4046.1	1616.5	1263.5	5309.6	4.20	3286.5	2023.0	0.40
1.90	4209.4	1570.8	1309.2	5518.5	4.22	3413.9	2104.7	0.37
2.30	4363.6	1529.7	1350.3	5713.8	4.23	3532.1	2181.8	0.35
2.70	4512.6	1479.5	1400.5	5913.1	4.22	3656.8	2256.3	0.33
3.10	4656.5	1433.8	1446.2	6102.6	4.22	3774.4	2328.2	0.31
3.58	4843.9	1379.0	1501.0	6344.8	4.23	3922.9	2421.9	0.28
4.05	5007.0	1315.1	1564.9	6571.9	4.20	4068.4	2503.5	0.26
4.54	5175.2	1255.8	1624.2	6799.4	4.19	4211.8	2587.6	0.24
5.10	5359.0	1187.3	1692.7	7051.8	4.17	4372.3	2679.5	0.22
5.66	5507.6	1118.8	1761.2	7268.9	4.13	4515.0	2753.8	0.20
6.31	5674.1	1045.7	1834.3	7508.4	4.09	4671.3	2837.1	0.18
7.13	5837.9	940.7	1939.3	7777.2	4.01	4858.3	2918.9	0.16
7.94	6020.5	853.9	2026.1	8046.6	3.97	5036.3	3010.2	0.14
8.75	6198.6	762.6	2117.4	8316.1	3.93	5216.7	3099.3	0.12
9.73	6378.6	662.1	2217.9	8596.5	3.88	5407.2	3189.3	0.10
10.69	6540.2	611.9	2268.1	8808.3	3.88	5538.2	3270.1	0.09
11.85	6726.8	543.4	2336.6	9063.4	3.88	5700.0	3363.4	0.08
13.00	6913.4	442.9	2437.1	9350.5	3.84	5893.8	3456.7	0.06
14.16	7078.9	369.9	2510.1	9589.1	3.82	6049.6	3539.5	0.05
15.51	7205.0	242.0	2638.0	9842.9	3.73	6240.5	3602.5	0.03
17.01	7306.1	150.7	2729.3	10035.4	3.68	6382.4	3653.0	0.02
18.66	7472.1	59.4	2820.6	10292.7	3.65	6556.7	3736.0	0.01
20.19	7614.6	-22.8	2902.8	10517.4	3.62	6710.1	3807.3	0.00

APPENDIX C

STABILITY ANALYSES

APPENDIX C
STABILITY ANALYSES

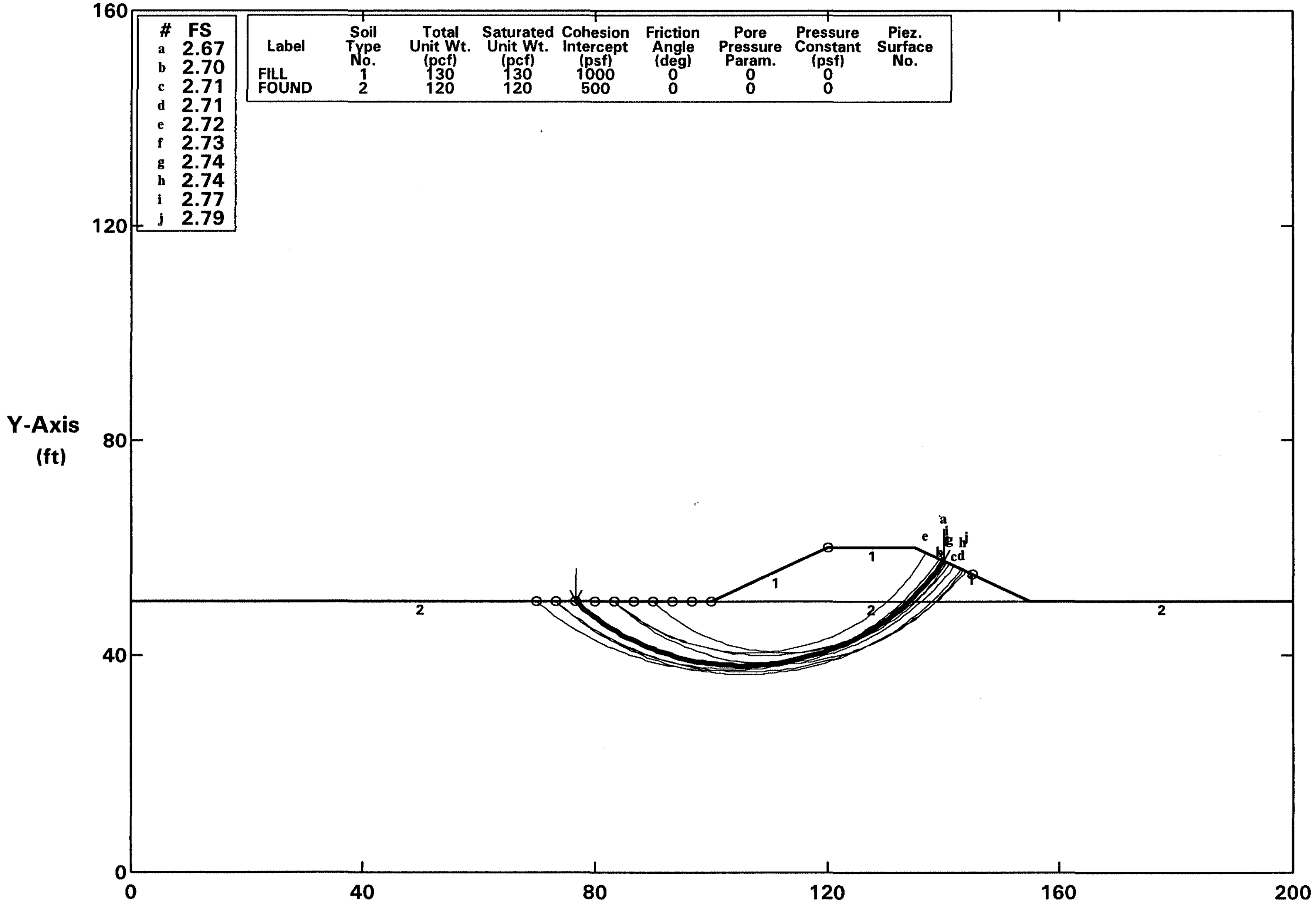
This appendix contains the computer stability analyses performed for the selected critical sections of the west and east levees, as discussed in Section 5.1 of the report. Computer analysis results are provided for only the most critical failure surface generated for each condition of analysis. The computer results are provided for each analysis condition in the order presented in the stability analyses results summary, Table 5-2, in the report.

WEST LEVEE

STABILITY ANALYSES

THOMPSON CREEK / END OF CONSTRUCTION / WATERSIDE / STATIC - WEST LEVEE

Ten Most Critical. C:ECWSS2W.PLT By: STAN KLINE 04-20-99 5:20pm



#	FS
a	2.67
b	2.70
c	2.71
d	2.71
e	2.72
f	2.73
g	2.74
h	2.74
i	2.77
j	2.79

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	1000	0	0	0	
FOUND	2	120	120	500	0	0	0	

PCSTABL5M/SI FSmin = 2.67 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

```
                            ** PCSTABL5M **

                                  by
                           Purdue University
------------------------------------------------------------------------------

                      --Slope Stability Analysis--
                   Simplified Janbu, Simplified Bishop
                      or Spencer's Method of Slices


         Run Date:                  04-20-99
         Time of Run:               5:20pm
         Run By:                    STAN KLINE
         Input Data Filename:       C:ECWSS2W.IN
         Output Filename:           C:ECWSS2W.OUT
         Unit:
         Plotted Output Filename:   C:ECWSS2W.PLT



         PROBLEM DESCRIPTION   THOMPSON CREEK / END OF CONSTRUCTION /
                               WATERSIDE / STATIC - WEST LEVEE



         BOUNDARY COORDINATES

             5 Top   Boundaries
             6 Total Boundaries


         Boundary      X-Left      Y-Left     X-Right      Y-Right     Soil Type
           No.         (ft,m)      (ft,m)      (ft,m)       (ft,m)     Below Bnd

            1             .00       50.00      100.00        50.00         2
            2          100.00       50.00      120.00        60.00         1
            3          120.00       60.00      135.00        60.00         1
            4          135.00       60.00      155.00        50.00         1
            5          155.00       50.00      200.00        50.00         2
            6          100.00       50.00      155.00        50.00         2
-------------------------------------------------------------------------------


        ISOTROPIC SOIL PARAMETERS


          2 Type(s) of Soil


         Soil  Total  Saturated  Cohesion Friction   Pore   Pressure  Piez.
         Type Unit Wt. Unit Wt. Intercept  Angle   Pressure Constant Surface
          No.    (pcf,KN/m3)    (psf,KPa)  (deg)    Param. (psf,KPa)   No.

           1   130.0    130.0    1000.0       .0      .00        .0      0
           2   120.0    120.0     500.0       .0      .00        .0      0
```

```
--------------------------------------------------------------------------------

         A Critical Failure Surface Searching Method, Using A Random
         Technique For Generating Circular Surfaces, Has Been Specified.


         100 Trial Surfaces Have Been Generated.


          10 Surfaces Initiate From Each Of 10 Points Equally Spaced
         Along The Ground Surface Between  X =  70.00 (ft,m)
                                     and   X = 100.00 (ft,m)


         Each Surface Terminates Between   X = 120.00 (ft,m)
                                    and    X = 145.00 (ft,m)


         Unless Further Limitations Were Imposed, The Minimum Elevation
         At Which A Surface Extends Is  Y = 20.00 (ft,m)


          1.00 (ft,m) Line Segments Define Each Trial Failure Surface.

 -------------------------------------------------------------------------------

         Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.


         * * Safety Factors Are Calculated By The Modified Bishop Method * *


         Failure Surface Specified By 75 Coordinate Points


           Point       X-Surf       Y-Surf
            No.        (ft,m)       (ft,m)

             1          76.67        50.00
             2          77.38        49.30
             3          78.12        48.62
             4          78.86        47.96
             5          79.63        47.31
             6          80.41        46.69
             7          81.21        46.08
             8          82.02        45.50
             9          82.84        44.93
            10          83.68        44.39
            11          84.53        43.86
            12          85.40        43.36
            13          86.27        42.88
            14          87.16        42.42
            15          88.06        41.98
```

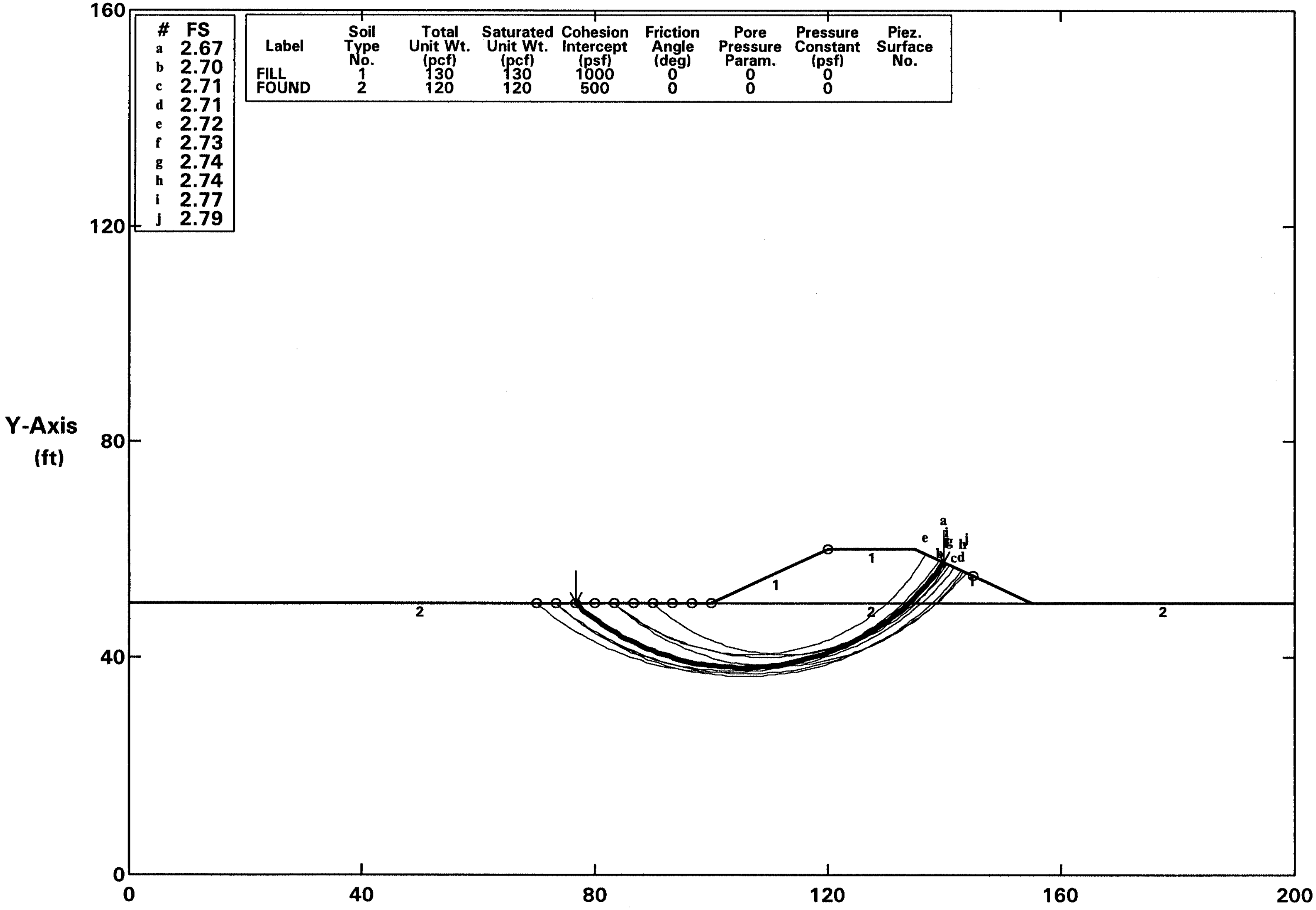
16	88.97	41.57
17	89.89	41.18
18	90.82	40.81
19	91.76	40.46
20	92.70	40.13
21	93.66	39.83
22	94.62	39.56
23	95.59	39.31
24	96.56	39.08
25	97.54	38.87
26	98.52	38.69
27	99.51	38.54
28	100.50	38.40
29	101.49	38.30
30	102.49	38.21
31	103.49	38.16
32	104.49	38.12
33	105.49	38.11
34	106.49	38.13
35	107.49	38.17
36	108.49	38.24
37	109.48	38.33
38	110.47	38.44
39	111.47	38.58
40	112.45	38.74
41	113.43	38.93
42	114.41	39.14
43	115.38	39.38
44	116.35	39.64
45	117.31	39.92
46	118.26	40.23
47	119.20	40.56
48	120.14	40.91
49	121.07	41.29
50	121.98	41.69
51	122.89	42.11
52	123.78	42.55
53	124.67	43.02
54	125.54	43.51
55	126.40	44.02
56	127.25	44.55
57	128.09	45.10
58	128.91	45.67
59	129.71	46.26
60	130.50	46.87
61	131.28	47.50
62	132.04	48.15
63	132.79	48.82
64	133.51	49.50
65	134.22	50.21
66	134.92	50.93
67	135.59	51.67
68	136.25	52.42
69	136.88	53.19
70	137.50	53.98
71	138.10	54.78
72	138.68	55.59
73	139.24	56.42

```
            74         139.78         57.27
            75         139.94         57.53

        Circle Center At X =  105.3 ; Y =   78.6  and Radius,   40.5


              ***     2.672   ***




              Individual data on the    78  slices


                          Water  Water      Tie     Tie      Earthquake
                          Force  Force     Force   Force        Force   Surcharge
Slice   Width   Weight     Top    Bot      Norm     Tan      Hor     Ver     Load
 No.   (ft,m) (lbs,kg) (lbs,N) (lbs,N)  (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N)
  1       .7     30.0      .0      .0       .0      .0      .0      .0      .0
  2       .7     91.3      .0      .0       .0      .0      .0      .0      .0
  3       .7    153.8      .0      .0       .0      .0      .0      .0      .0
  4       .8    217.1      .0      .0       .0      .0      .0      .0      .0
  5       .8    280.9      .0      .0       .0      .0      .0      .0      .0
  6       .8    345.1      .0      .0       .0      .0      .0      .0      .0
  7       .8    409.4      .0      .0       .0      .0      .0      .0      .0
  8       .8    473.6      .0      .0       .0      .0      .0      .0      .0
  9       .8    537.3      .0      .0       .0      .0      .0      .0      .0
 10       .9    600.4      .0      .0       .0      .0      .0      .0      .0
 11       .9    662.5      .0      .0       .0      .0      .0      .0      .0
 12       .9    723.6      .0      .0       .0      .0      .0      .0      .0
 13       .9    783.3      .0      .0       .0      .0      .0      .0      .0
 14       .9    841.5      .0      .0       .0      .0      .0      .0      .0
 15       .9    897.9      .0      .0       .0      .0      .0      .0      .0
 16       .9    952.3      .0      .0       .0      .0      .0      .0      .0
 17       .9   1004.5      .0      .0       .0      .0      .0      .0      .0
 18       .9   1054.4      .0      .0       .0      .0      .0      .0      .0
 19       .9   1101.8      .0      .0       .0      .0      .0      .0      .0
 20      1.0   1146.4      .0      .0       .0      .0      .0      .0      .0
 21      1.0   1188.2      .0      .0       .0      .0      .0      .0      .0
 22      1.0   1227.0      .0      .0       .0      .0      .0      .0      .0
 23      1.0   1262.7      .0      .0       .0      .0      .0      .0      .0
 24      1.0   1295.1      .0      .0       .0      .0      .0      .0      .0
 25      1.0   1324.1      .0      .0       .0      .0      .0      .0      .0
 26      1.0   1349.6      .0      .0       .0      .0      .0      .0      .0
 27       .5    677.8      .0      .0       .0      .0      .0      .0      .0
 28       .5    701.9      .0      .0       .0      .0      .0      .0      .0
 29      1.0   1454.3      .0      .0       .0      .0      .0      .0      .0
 30      1.0   1533.6      .0      .0       .0      .0      .0      .0      .0
 31      1.0   1609.4      .0      .0       .0      .0      .0      .0      .0
 32      1.0   1681.6      .0      .0       .0      .0      .0      .0      .0
 33      1.0   1750.0      .0      .0       .0      .0      .0      .0      .0
 34      1.0   1814.4      .0      .0       .0      .0      .0      .0      .0
 35      1.0   1874.6      .0      .0       .0      .0      .0      .0      .0
 36      1.0   1930.6      .0      .0       .0      .0      .0      .0      .0
 37      1.0   1982.2      .0      .0       .0      .0      .0      .0      .0
 38      1.0   2029.2      .0      .0       .0      .0      .0      .0      .0
 39      1.0   2071.6      .0      .0       .0      .0      .0      .0      .0
 40      1.0   2109.3      .0      .0       .0      .0      .0      .0      .0
```

41	1.0	2142.3	.0	.0	.0	.0	.0	.0	.0
42	1.0	2170.3	.0	.0	.0	.0	.0	.0	.0
43	1.0	2193.6	.0	.0	.0	.0	.0	.0	.0
44	1.0	2211.8	.0	.0	.0	.0	.0	.0	.0
45	1.0	2225.2	.0	.0	.0	.0	.0	.0	.0
46	1.0	2233.7	.0	.0	.0	.0	.0	.0	.0
47	.9	2237.3	.0	.0	.0	.0	.0	.0	.0
48	.8	1903.3	.0	.0	.0	.0	.0	.0	.0
49	.1	332.2	.0	.0	.0	.0	.0	.0	.0
50	.9	2193.7	.0	.0	.0	.0	.0	.0	.0
51	.9	2128.4	.0	.0	.0	.0	.0	.0	.0
52	.9	2060.2	.0	.0	.0	.0	.0	.0	.0
53	.9	1989.4	.0	.0	.0	.0	.0	.0	.0
54	.9	1916.2	.0	.0	.0	.0	.0	.0	.0
55	.9	1840.7	.0	.0	.0	.0	.0	.0	.0
56	.9	1763.3	.0	.0	.0	.0	.0	.0	.0
57	.8	1684.2	.0	.0	.0	.0	.0	.0	.0
58	.8	1603.6	.0	.0	.0	.0	.0	.0	.0
59	.8	1521.7	.0	.0	.0	.0	.0	.0	.0
60	.8	1438.9	.0	.0	.0	.0	.0	.0	.0
61	.8	1355.3	.0	.0	.0	.0	.0	.0	.0
62	.8	1271.2	.0	.0	.0	.0	.0	.0	.0
63	.8	1187.0	.0	.0	.0	.0	.0	.0	.0
64	.7	1102.8	.0	.0	.0	.0	.0	.0	.0
65	.7	1018.9	.0	.0	.0	.0	.0	.0	.0
66	.5	664.8	.0	.0	.0	.0	.0	.0	.0
67	.2	270.7	.0	.0	.0	.0	.0	.0	.0
68	.7	849.3	.0	.0	.0	.0	.0	.0	.0
69	.1	98.8	.0	.0	.0	.0	.0	.0	.0
70	.6	653.1	.0	.0	.0	.0	.0	.0	.0
71	.7	639.6	.0	.0	.0	.0	.0	.0	.0
72	.6	531.2	.0	.0	.0	.0	.0	.0	.0
73	.6	427.4	.0	.0	.0	.0	.0	.0	.0
74	.6	328.5	.0	.0	.0	.0	.0	.0	.0
75	.6	234.6	.0	.0	.0	.0	.0	.0	.0
76	.6	146.0	.0	.0	.0	.0	.0	.0	.0
77	.5	62.9	.0	.0	.0	.0	.0	.0	.0
78	.2	3.6	.0	.0	.0	.0	.0	.0	.0

THOMPSON CREEK / END OF CONSTRUCTION / LANDSIDE / STATIC - WEST LEVEE

Ten Most Critical. C:ECLSS2W.PLT By: STAN KLINE 04-20-99 5:52pm



Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	1000	0	0	0	
FOUND	2	120	120	500	0	0	0	

PCSTABL5M/SI FSmin = 2.67 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

```
                           ** PCSTABL5M **

                                 by
                          Purdue University
------------------------------------------------------------------------------

                      --Slope Stability Analysis--
                  Simplified Janbu, Simplified Bishop
                     or Spencer's Method of Slices


         Run Date:                    04-20-99
         Time of Run:                 5:52pm
         Run By:                      STAN KLINE
         Input Data Filename:         C:ECLSS2W.IN
         Output Filename:             C:ECLSS2W.OUT
         Unit:
         Plotted Output Filename:     C:ECLSS2W.PLT



         PROBLEM DESCRIPTION   THOMPSON CREEK / END OF CONSTRUCTION /
                               LANDSIDE / STATIC - WEST LEVEE



         BOUNDARY COORDINATES

             5 Top   Boundaries
             6 Total Boundaries

         Boundary      X-Left     Y-Left     X-Right     Y-Right     Soil Type
           No.         (ft,m)     (ft,m)      (ft,m)      (ft,m)     Below Bnd

            1              .00      50.00      100.00       50.00         2
            2           100.00      50.00      120.00       60.00         1
            3           120.00      60.00      135.00       60.00         1
            4           135.00      60.00      155.00       50.00         1
            5           155.00      50.00      200.00       50.00         2
            6           100.00      50.00      155.00       50.00         2
------------------------------------------------------------------------------


        ISOTROPIC SOIL PARAMETERS


          2 Type(s) of Soil


         Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
         Type Unit Wt. Unit Wt. Intercept  Angle   Pressure Constant Surface
          No.    (pcf,KN/m3)     (psf,KPa)  (deg)    Param. (psf,KPa)   No.

           1   130.0     130.0    1000.0       .0       .00        .0      0
           2   120.0     120.0     500.0       .0       .00        .0      0
```

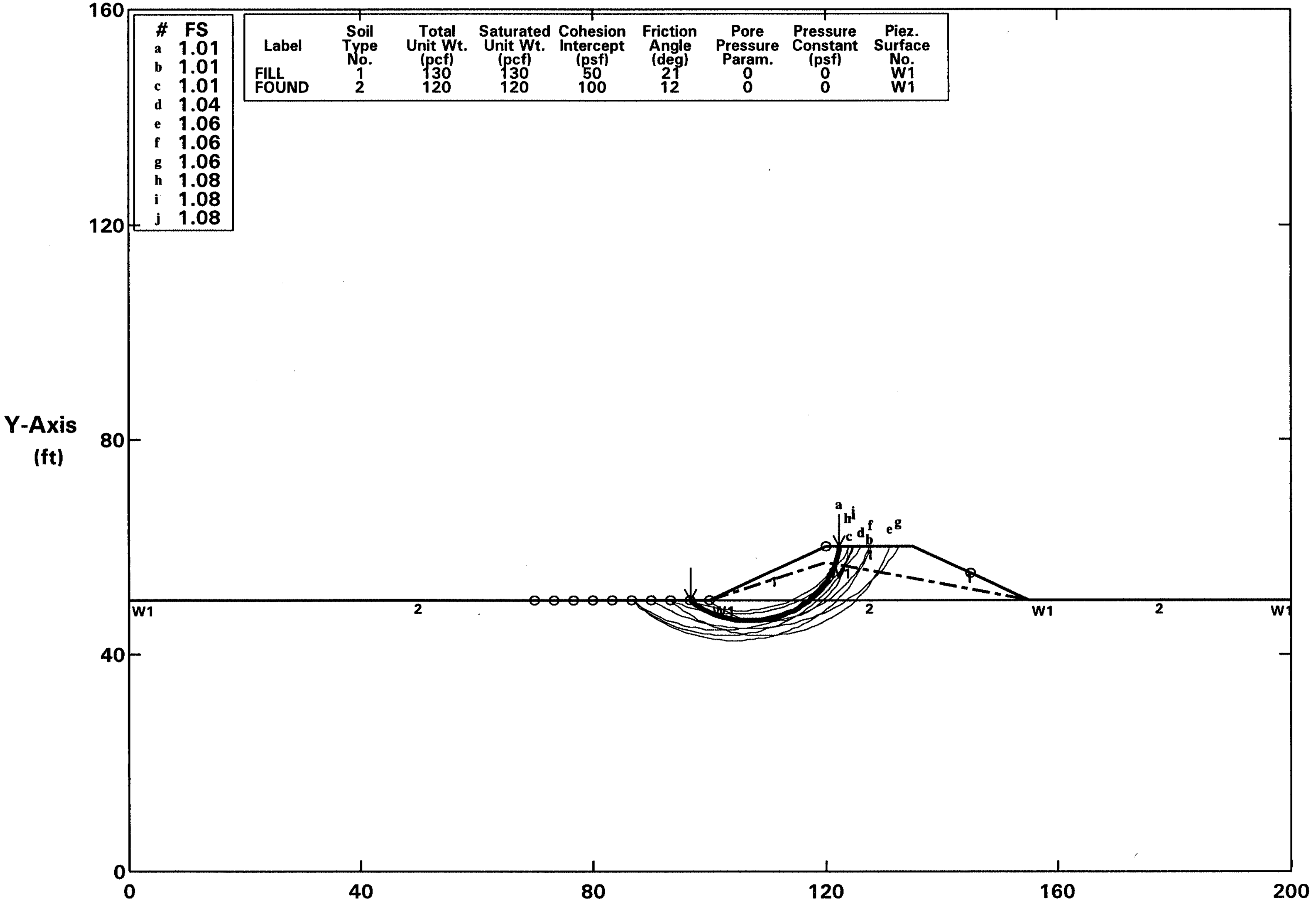
```
--------------------------------------------------------------------------------

        A Critical Failure Surface Searching Method, Using A Random
        Technique For Generating Circular Surfaces, Has Been Specified.


        100 Trial Surfaces Have Been Generated.


         10 Surfaces Initiate From Each Of 10 Points Equally Spaced
        Along The Ground Surface Between  X =  70.00 (ft,m)
                                     and  X = 100.00 (ft,m)


        Each Surface Terminates Between   X = 120.00 (ft,m)
                                    and   X = 145.00 (ft,m)


        Unless Further Limitations Were Imposed, The Minimum Elevation
        At Which A Surface Extends Is  Y = 20.00 (ft,m)


         1.00 (ft,m) Line Segments Define Each Trial Failure Surface.

--------------------------------------------------------------------------------

        Following Are Displayed The Ten Most Critical Of The Trial
        Failure Surfaces Examined.  They Are Ordered - Most Critical
        First.


        * * Safety Factors Are Calculated By The Modified Bishop Method * *


        Failure Surface Specified By 75 Coordinate Points


          Point       X-Surf      Y-Surf
           No.        (ft,m)      (ft,m)

            1          76.67       50.00
            2          77.38       49.30
            3          78.12       48.62
            4          78.86       47.96
            5          79.63       47.31
            6          80.41       46.69
            7          81.21       46.08
            8          82.02       45.50
            9          82.84       44.93
           10          83.68       44.39
           11          84.53       43.86
           12          85.40       43.36
           13          86.27       42.88
           14          87.16       42.42
           15          88.06       41.98
```

16	88.97	41.57
17	89.89	41.18
18	90.82	40.81
19	91.76	40.46
20	92.70	40.13
21	93.66	39.83
22	94.62	39.56
23	95.59	39.31
24	96.56	39.08
25	97.54	38.87
26	98.52	38.69
27	99.51	38.54
28	100.50	38.40
29	101.49	38.30
30	102.49	38.21
31	103.49	38.16
32	104.49	38.12
33	105.49	38.11
34	106.49	38.13
35	107.49	38.17
36	108.49	38.24
37	109.48	38.33
38	110.47	38.44
39	111.47	38.58
40	112.45	38.74
41	113.43	38.93
42	114.41	39.14
43	115.38	39.38
44	116.35	39.64
45	117.31	39.92
46	118.26	40.23
47	119.20	40.56
48	120.14	40.91
49	121.07	41.29
50	121.98	41.69
51	122.89	42.11
52	123.78	42.55
53	124.67	43.02
54	125.54	43.51
55	126.40	44.02
56	127.25	44.55
57	128.09	45.10
58	128.91	45.67
59	129.71	46.26
60	130.50	46.87
61	131.28	47.50
62	132.04	48.15
63	132.79	48.82
64	133.51	49.50
65	134.22	50.21
66	134.92	50.93
67	135.59	51.67
68	136.25	52.42
69	136.88	53.19
70	137.50	53.98
71	138.10	54.78
72	138.68	55.59
73	139.24	56.42

```
          74         139.78        57.27
          75         139.94        57.53

     Circle Center At X =  105.3 ; Y =   78.6  and Radius,   40.5


           ***     2.672   ***



            Individual data on the    78  slices


                               Water  Water      Tie      Tie      Earthquake
                               Force  Force     Force    Force        Force   Surcharge
Slice   Width    Weight         Top    Bot      Norm      Tan      Hor      Ver     Load
 No.   (ft,m)  (lbs,kg)    (lbs,N)(lbs,N)   (lbs,N)  (lbs,N)  (lbs,N)  (lbs,N)  (lbs,N)
  1        .7      30.0        .0       .0        .0       .0       .0       .0       .0
  2        .7      91.3        .0       .0        .0       .0       .0       .0       .0
  3        .7     153.8        .0       .0        .0       .0       .0       .0       .0
  4        .8     217.1        .0       .0        .0       .0       .0       .0       .0
  5        .8     280.9        .0       .0        .0       .0       .0       .0       .0
  6        .8     345.1        .0       .0        .0       .0       .0       .0       .0
  7        .8     409.4        .0       .0        .0       .0       .0       .0       .0
  8        .8     473.6        .0       .0        .0       .0       .0       .0       .0
  9        .8     537.3        .0       .0        .0       .0       .0       .0       .0
 10        .9     600.4        .0       .0        .0       .0       .0       .0       .0
 11        .9     662.5        .0       .0        .0       .0       .0       .0       .0
 12        .9     723.6        .0       .0        .0       .0       .0       .0       .0
 13        .9     783.3        .0       .0        .0       .0       .0       .0       .0
 14        .9     841.5        .0       .0        .0       .0       .0       .0       .0
 15        .9     897.9        .0       .0        .0       .0       .0       .0       .0
 16        .9     952.3        .0       .0        .0       .0       .0       .0       .0
 17        .9    1004.5        .0       .0        .0       .0       .0       .0       .0
 18        .9    1054.4        .0       .0        .0       .0       .0       .0       .0
 19        .9    1101.8        .0       .0        .0       .0       .0       .0       .0
 20       1.0    1146.4        .0       .0        .0       .0       .0       .0       .0
 21       1.0    1188.2        .0       .0        .0       .0       .0       .0       .0
 22       1.0    1227.0        .0       .0        .0       .0       .0       .0       .0
 23       1.0    1262.7        .0       .0        .0       .0       .0       .0       .0
 24       1.0    1295.1        .0       .0        .0       .0       .0       .0       .0
 25       1.0    1324.1        .0       .0        .0       .0       .0       .0       .0
 26       1.0    1349.6        .0       .0        .0       .0       .0       .0       .0
 27        .5     677.8        .0       .0        .0       .0       .0       .0       .0
 28        .5     701.9        .0       .0        .0       .0       .0       .0       .0
 29       1.0    1454.3        .0       .0        .0       .0       .0       .0       .0
 30       1.0    1533.6        .0       .0        .0       .0       .0       .0       .0
 31       1.0    1609.4        .0       .0        .0       .0       .0       .0       .0
 32       1.0    1681.6        .0       .0        .0       .0       .0       .0       .0
 33       1.0    1750.0        .0       .0        .0       .0       .0       .0       .0
 34       1.0    1814.4        .0       .0        .0       .0       .0       .0       .0
 35       1.0    1874.6        .0       .0        .0       .0       .0       .0       .0
 36       1.0    1930.6        .0       .0        .0       .0       .0       .0       .0
 37       1.0    1982.2        .0       .0        .0       .0       .0       .0       .0
 38       1.0    2029.2        .0       .0        .0       .0       .0       .0       .0
 39       1.0    2071.6        .0       .0        .0       .0       .0       .0       .0
 40       1.0    2109.3        .0       .0        .0       .0       .0       .0       .0
```

41	1.0	2142.3	.0	.0	.0	.0	.0	.0	.0
42	1.0	2170.3	.0	.0	.0	.0	.0	.0	.0
43	1.0	2193.6	.0	.0	.0	.0	.0	.0	.0
44	1.0	2211.8	.0	.0	.0	.0	.0	.0	.0
45	1.0	2225.2	.0	.0	.0	.0	.0	.0	.0
46	1.0	2233.7	.0	.0	.0	.0	.0	.0	.0
47	.9	2237.3	.0	.0	.0	.0	.0	.0	.0
48	.8	1903.3	.0	.0	.0	.0	.0	.0	.0
49	.1	332.2	.0	.0	.0	.0	.0	.0	.0
50	.9	2193.7	.0	.0	.0	.0	.0	.0	.0
51	.9	2128.4	.0	.0	.0	.0	.0	.0	.0
52	.9	2060.2	.0	.0	.0	.0	.0	.0	.0
53	.9	1989.4	.0	.0	.0	.0	.0	.0	.0
54	.9	1916.2	.0	.0	.0	.0	.0	.0	.0
55	.9	1840.7	.0	.0	.0	.0	.0	.0	.0
56	.9	1763.3	.0	.0	.0	.0	.0	.0	.0
57	.8	1684.2	.0	.0	.0	.0	.0	.0	.0
58	.8	1603.6	.0	.0	.0	.0	.0	.0	.0
59	.8	1521.7	.0	.0	.0	.0	.0	.0	.0
60	.8	1438.9	.0	.0	.0	.0	.0	.0	.0
61	.8	1355.3	.0	.0	.0	.0	.0	.0	.0
62	.8	1271.2	.0	.0	.0	.0	.0	.0	.0
63	.8	1187.0	.0	.0	.0	.0	.0	.0	.0
64	.7	1102.8	.0	.0	.0	.0	.0	.0	.0
65	.7	1018.9	.0	.0	.0	.0	.0	.0	.0
66	.5	664.8	.0	.0	.0	.0	.0	.0	.0
67	.2	270.7	.0	.0	.0	.0	.0	.0	.0
68	.7	849.3	.0	.0	.0	.0	.0	.0	.0
69	.1	98.8	.0	.0	.0	.0	.0	.0	.0
70	.6	653.1	.0	.0	.0	.0	.0	.0	.0
71	.7	639.6	.0	.0	.0	.0	.0	.0	.0
72	.6	531.2	.0	.0	.0	.0	.0	.0	.0
73	.6	427.4	.0	.0	.0	.0	.0	.0	.0
74	.6	328.5	.0	.0	.0	.0	.0	.0	.0
75	.6	234.6	.0	.0	.0	.0	.0	.0	.0
76	.6	146.0	.0	.0	.0	.0	.0	.0	.0
77	.5	62.9	.0	.0	.0	.0	.0	.0	.0
78	.2	3.6	.0	.0	.0	.0	.0	.0	.0

THOMPSON CREEK / SUDDEN DRAWDOWN / WATERSIDE / STATIC - WEST LEVEE
Ten Most Critical. C:SDWSS6W.PLT By: STAN KLINE 04-20-99 5:58pm



#	FS
a	1.01
b	1.01
c	1.01
d	1.04
e	1.06
f	1.06
g	1.06
h	1.08
i	1.08
j	1.08

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	50	21	0	0	W1
FOUND	2	120	120	100	12	0	0	W1

PCSTABL5M/SI FSmin = 1.01 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

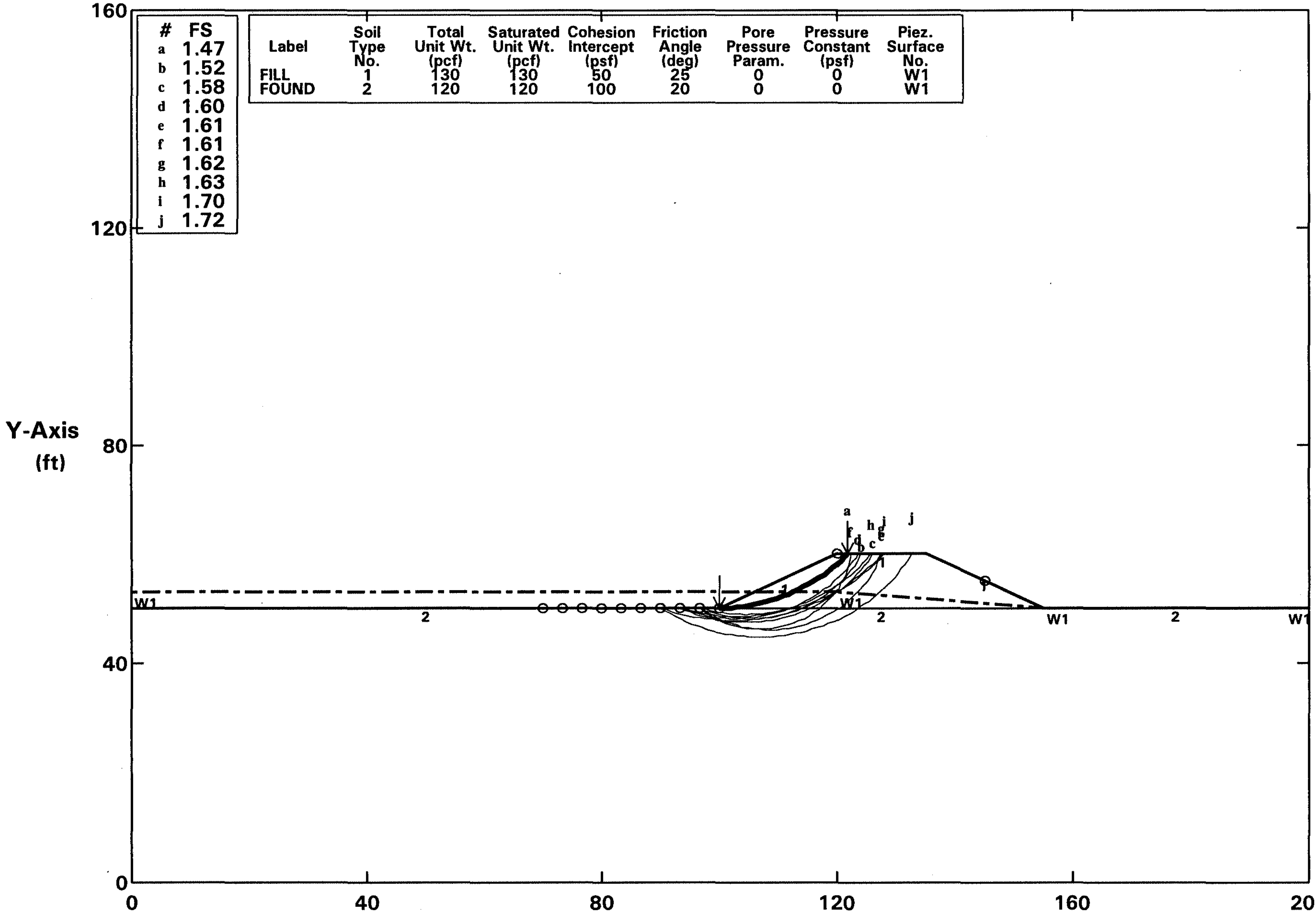
```
                             ** PCSTABL5M **

                                   by
                            Purdue University
--------------------------------------------------------------------------------

                        --Slope Stability Analysis--
                    Simplified Janbu, Simplified Bishop
                       or Spencer's Method of Slices


          Run Date:                  04-20-99
          Time of Run:               5:58pm
          Run By:                    STAN KLINE
          Input Data Filename:       C:SDWSS6W.IN
          Output Filename:           C:SDWSS6W.OUT
          Unit:
          Plotted Output Filename:   C:SDWSS6W.PLT



          PROBLEM DESCRIPTION   THOMPSON CREEK / SUDDEN DRAWDOWN /
                                WATERSIDE / STATIC - WEST LEVEE



          BOUNDARY COORDINATES

              5 Top   Boundaries
              6 Total Boundaries

          Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
             No.       (ft,m)     (ft,m)      (ft,m)      (ft,m)     Below Bnd

             1            .00      50.00      100.00       50.00         2
             2         100.00      50.00      120.00       60.00         1
             3         120.00      60.00      135.00       60.00         1
             4         135.00      60.00      155.00       50.00         1
             5         155.00      50.00      200.00       50.00         2
             6         100.00      50.00      155.00       50.00         2
--------------------------------------------------------------------------------

         ISOTROPIC SOIL PARAMETERS


           2 Type(s) of Soil


          Soil  Total  Saturated  Cohesion Friction   Pore   Pressure  Piez.
          Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant Surface
           No.   (pcf,KN/m3)     (psf,KPa)  (deg)   Param. (psf,KPa)   No.

            1   130.0     130.0     50.0     21.0     .00        .0      1
            2   120.0     120.0    100.0     12.0     .00        .0      1
```

```
-------------------------------------------------------------------------------

         1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

         Unit Weight of Water =  62.40

         Piezometric Surface No.  1 Specified by  5 Coordinate Points

           Point      X-Water     Y-Water
            No.        (ft,m)      (ft,m)

             1           .00       50.00
             2        100.00       50.00
             3        120.00       57.00
             4        155.00       50.00
             5        200.00       50.00
-------------------------------------------------------------------------------

         A Critical Failure Surface Searching Method, Using A Random
         Technique For Generating Circular Surfaces, Has Been Specified.

         100 Trial Surfaces Have Been Generated.

          10 Surfaces Initiate From Each Of 10 Points Equally Spaced
         Along The Ground Surface Between  X =  70.00 (ft,m)
                                      and  X = 100.00 (ft,m)

         Each Surface Terminates Between   X = 120.00 (ft,m)
                                     and   X = 145.00 (ft,m)

         Unless Further Limitations Were Imposed, The Minimum Elevation
         At Which A Surface Extends Is  Y = 20.00 (ft,m)

          1.00 (ft,m) Line Segments Define Each Trial Failure Surface.

-------------------------------------------------------------------------------

         Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.

         * * Safety Factors Are Calculated By The Modified Bishop Method * *
```

```
        Failure Surface Specified By 35 Coordinate Points

          Point        X-Surf       Y-Surf
           No.         (ft,m)       (ft,m)

            1           96.67        50.00
            2           97.44        49.37
            3           98.25        48.78
            4           99.10        48.26
            5           99.98        47.78
            6          100.89        47.37
            7          101.83        47.01
            8          102.78        46.72
            9          103.76        46.48
           10          104.74        46.31
           11          105.74        46.21
           12          106.74        46.17
           13          107.73        46.19
           14          108.73        46.27
           15          109.72        46.43
           16          110.70        46.64
           17          111.66        46.92
           18          112.60        47.25
           19          113.52        47.65
           20          114.41        48.11
           21          115.27        48.62
           22          116.09        49.18
           23          116.88        49.80
           24          117.62        50.47
           25          118.32        51.18
           26          118.97        51.94
           27          119.58        52.74
           28          120.13        53.57
           29          120.62        54.44
           30          121.06        55.34
           31          121.44        56.27
           32          121.76        57.21
           33          122.02        58.18
           34          122.21        59.16
           35          122.32        60.00

        Circle Center At X =  106.9 ; Y =   61.7  and Radius,   15.5


             ***     1.006   ***




             Individual data on the    38  slices

                          Water  Water     Tie     Tie     Earthquake
                          Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight      Top    Bot     Norm     Tan     Hor     Ver     Load
 No.  (ft,m) (lbs,kg)  (lbs,N)(lbs,N)  (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N)
  1      .8     29.4       .0   19.8       .0      .0      .0      .0      .0
```

2	.8	90.2	.0	57.7	.0	.0	.0	.0	.0
3	.8	150.7	.0	92.3	.0	.0	.0	.0	.0
4	.9	209.4	.0	123.6	.0	.0	.0	.0	.0
5	.0	4.3	.0	2.4	.0	.0	.0	.0	.0
6	.9	286.4	.0	149.8	.0	.0	.0	.0	.0
7	.9	397.8	.0	193.9	.0	.0	.0	.0	.0
8	1.0	502.8	.0	232.6	.0	.0	.0	.0	.0
9	1.0	603.5	.0	268.1	.0	.0	.0	.0	.0
10	1.0	698.1	.0	300.2	.0	.0	.0	.0	.0
11	1.0	784.8	.0	328.8	.0	.0	.0	.0	.0
12	1.0	862.2	.0	353.7	.0	.0	.0	.0	.0
13	1.0	928.8	.0	374.9	.0	.0	.0	.0	.0
14	1.0	983.7	.0	392.3	.0	.0	.0	.0	.0
15	1.0	1025.8	.0	405.8	.0	.0	.0	.0	.0
16	1.0	1054.7	.0	415.4	.0	.0	.0	.0	.0
17	1.0	1069.9	.0	420.9	.0	.0	.0	.0	.0
18	.9	1071.4	.0	422.5	.0	.0	.0	.0	.0
19	.9	1059.4	.0	420.0	.0	.0	.0	.0	.0
20	.9	1034.5	.0	413.5	.0	.0	.0	.0	.0
21	.9	997.2	.0	403.0	.0	.0	.0	.0	.0
22	.8	948.7	.0	388.5	.0	.0	.0	.0	.0
23	.8	890.1	.0	370.2	.0	.0	.0	.0	.0
24	.2	246.3	.0	105.7	.0	.0	.0	.0	.0
25	.5	575.3	.0	242.5	.0	.0	.0	.0	.0
26	.7	742.7	.0	322.3	.0	.0	.0	.0	.0
27	.7	658.7	.0	292.9	.0	.0	.0	.0	.0
28	.6	571.9	.0	260.0	.0	.0	.0	.0	.0
29	.4	376.1	.0	175.5	.0	.0	.0	.0	.0
30	.1	107.5	.0	49.5	.0	.0	.0	.0	.0
31	.5	385.8	.0	178.5	.0	.0	.0	.0	.0
32	.4	291.1	.0	118.7	.0	.0	.0	.0	.0
33	.4	207.1	.0	57.9	.0	.0	.0	.0	.0
34	.1	64.4	.0	6.0	.0	.0	.0	.0	.0
35	.2	70.9	.0	.0	.0	.0	.0	.0	.0
36	.3	77.1	.0	.0	.0	.0	.0	.0	.0
37	.2	33.7	.0	.0	.0	.0	.0	.0	.0
38	.1	6.1	.0	.0	.0	.0	.0	.0	.0

THOMPSON CREEK / INTERMEDIATE STAGE / WATERSIDE / STATIC - WEST LEVEE
Ten Most Critical. C:ISWSS8W.PLT By: STAN KLINE 04-20-99 6:02pm



#	FS
a	1.47
b	1.52
c	1.58
d	1.60
e	1.61
f	1.61
g	1.62
h	1.63
i	1.70
j	1.72

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	50	25	0	0	W1
FOUND	2	120	120	100	20	0	0	W1

PCSTABL5M/SI FSmin = 1.47 X-Axis (ft)
Factors Of Safety Calculated By The Modified Bishop Method

```
                        ** PCSTABL5M **

                              by
                       Purdue University
--------------------------------------------------------------------------------

                 --Slope Stability Analysis--
              Simplified Janbu, Simplified Bishop
                 or Spencer`s Method of Slices


          Run Date:                   04-20-99
          Time of Run:                6:02pm
          Run By:                     STAN KLINE
          Input Data Filename:        C:ISWSS8W.IN
          Output Filename:            C:ISWSS8W.OUT
          Unit:
          Plotted Output Filename:    C:ISWSS8W.PLT



          PROBLEM DESCRIPTION   THOMPSON CREEK / INTERMEDIATE STAGE /
                                WATERSIDE / STATIC - WEST LEVEE



          BOUNDARY COORDINATES

              5 Top   Boundaries
              6 Total Boundaries


          Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
             No.       (ft,m)     (ft,m)      (ft,m)      (ft,m)     Below Bnd

              1           .00      50.00      100.00       50.00         2
              2        100.00      50.00      120.00       60.00         1
              3        120.00      60.00      135.00       60.00         1
              4        135.00      60.00      155.00       50.00         1
              5        155.00      50.00      200.00       50.00         2
              6        100.00      50.00      155.00       50.00         2
--------------------------------------------------------------------------------


         ISOTROPIC SOIL PARAMETERS


           2 Type(s) of Soil


          Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
          Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
           No.    (pcf,KN/m3)    (psf,KPa)   (deg)   Param. (psf,KPa)    No.

            1   130.0    130.0      50.0     25.0     .00        .0       1
            2   120.0    120.0     100.0     20.0     .00        .0       1
```

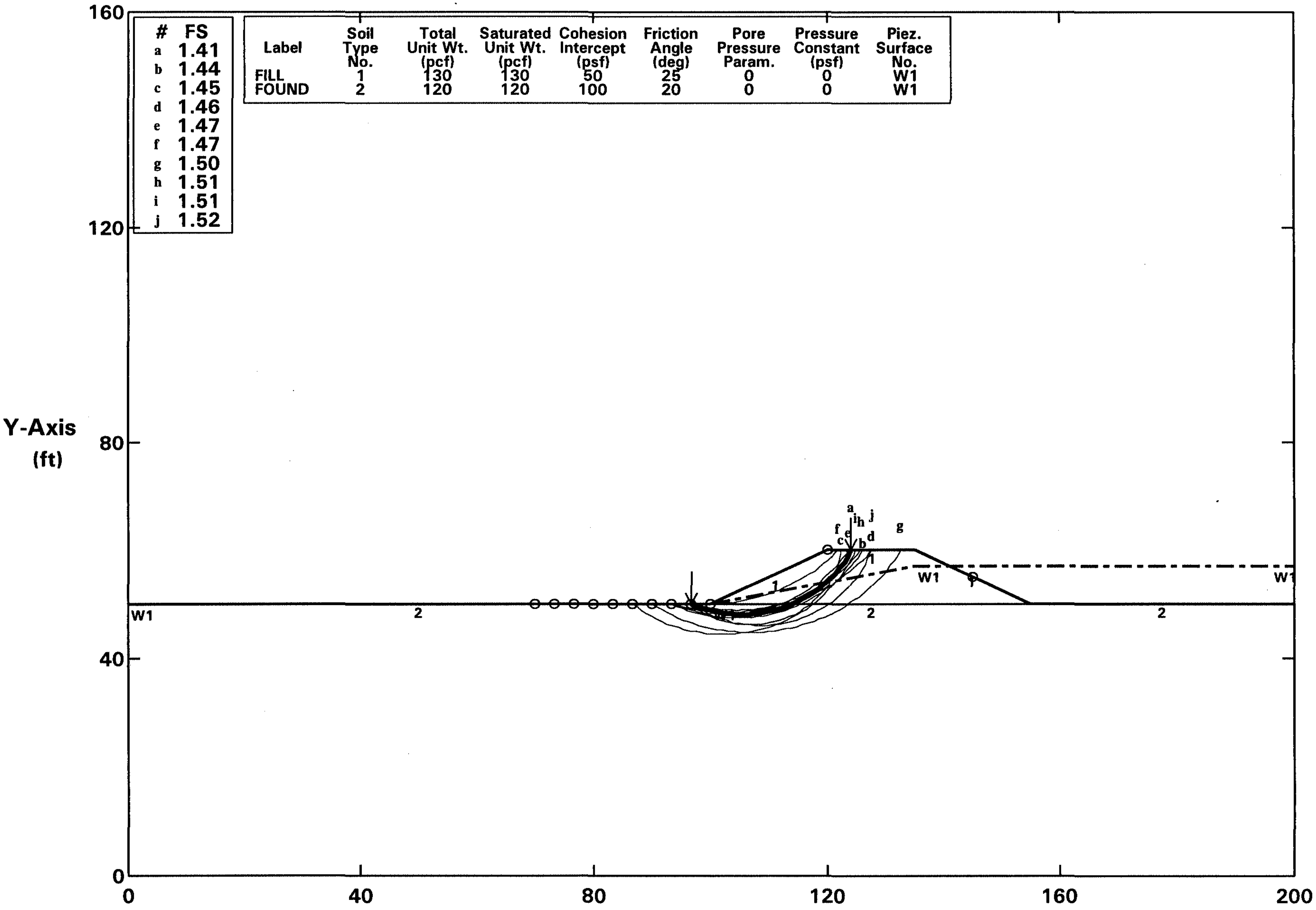
```
-------------------------------------------------------------------------------


         1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED


         Unit Weight of Water =  62.40


         Piezometric Surface No.  1 Specified by  4 Coordinate Points

           Point       X-Water      Y-Water
            No.         (ft,m)       (ft,m)

             1            .00        53.00
             2         120.00        53.00
             3         155.00        50.00
             4         200.00        50.00
-------------------------------------------------------------------------------


         A Critical Failure Surface Searching Method, Using A Random
         Technique For Generating Circular Surfaces, Has Been Specified.


         100 Trial Surfaces Have Been Generated.


          10 Surfaces Initiate From Each Of 10 Points Equally Spaced
         Along The Ground Surface Between  X =  70.00 (ft,m)
                                     and  X = 100.00 (ft,m)


         Each Surface Terminates Between   X = 120.00 (ft,m)
                                    and   X = 145.00 (ft,m)


         Unless Further Limitations Were Imposed, The Minimum Elevation
         At Which A Surface Extends Is  Y = 20.00 (ft,m)


          1.00 (ft,m) Line Segments Define Each Trial Failure Surface.


-------------------------------------------------------------------------------

         Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.


         * * Safety Factors Are Calculated By The Modified Bishop Method * *



         Failure Surface Specified By 26 Coordinate Points
```

```
          Point       X-Surf       Y-Surf
           No.        (ft,m)       (ft,m)

            1         100.00        50.00
            2         101.00        50.03
            3         102.00        50.09
            4         102.99        50.18
            5         103.99        50.31
            6         104.97        50.47
            7         105.95        50.67
            8         106.93        50.90
            9         107.89        51.16
           10         108.85        51.46
           11         109.79        51.78
           12         110.72        52.14
           13         111.64        52.54
           14         112.55        52.96
           15         113.44        53.41
           16         114.32        53.89
           17         115.18        54.41
           18         116.02        54.95
           19         116.84        55.52
           20         117.64        56.12
           21         118.42        56.74
           22         119.18        57.39
           23         119.92        58.07
           24         120.63        58.77
           25         121.32        59.50
           26         121.76        60.00

        Circle Center At X =   99.7 ; Y =   79.3  and Radius,   29.3


              ***     1.466   ***



             Individual data on the    27  slices


                         Water  Water     Tie     Tie     Earthquake
                         Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot      Norm    Tan      Hor     Ver     Load
No.   (ft,m) (lbs,kg) (lbs,N)(lbs,N)  (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N)
  1     1.0     30.7   191.8  186.3       .0      .0      .0      .0      .0
  2     1.0     89.8   156.7  183.6       .0      .0      .0      .0      .0
  3     1.0    144.0   121.7  178.8       .0      .0      .0      .0      .0
  4     1.0    193.1    86.8  171.8       .0      .0      .0      .0      .0
  5     1.0    236.9    52.4  162.7       .0      .0      .0      .0      .0
  6     1.0    275.2    18.4  151.5       .0      .0      .0      .0      .0
  7     1.0    308.1      .0  138.2       .0      .0      .0      .0      .0
  8     1.0    335.4      .0  122.9       .0      .0      .0      .0      .0
  9     1.0    357.1      .0  105.5       .0      .0      .0      .0      .0
 10      .9    373.2      .0   86.0       .0      .0      .0      .0      .0
 11      .9    383.8      .0   64.6       .0      .0      .0      .0      .0
```

12	.9	389.1	.0	41.2	.0	.0	.0	.0	.0
13	.9	389.1	.0	15.8	.0	.0	.0	.0	.0
14	.1	35.4	.0	.1	.0	.0	.0	.0	.0
15	.8	348.6	.0	.0	.0	.0	.0	.0	.0
16	.9	374.1	.0	.0	.0	.0	.0	.0	.0
17	.9	359.7	.0	.0	.0	.0	.0	.0	.0
18	.8	340.9	.0	.0	.0	.0	.0	.0	.0
19	.8	318.2	.0	.0	.0	.0	.0	.0	.0
20	.8	291.9	.0	.0	.0	.0	.0	.0	.0
21	.8	262.4	.0	.0	.0	.0	.0	.0	.0
22	.8	230.2	.0	.0	.0	.0	.0	.0	.0
23	.7	195.5	.0	.0	.0	.0	.0	.0	.0
24	.1	20.3	.0	.0	.0	.0	.0	.0	.0
25	.6	125.8	.0	.0	.0	.0	.0	.0	.0
26	.7	77.5	.0	.0	.0	.0	.0	.0	.0
27	.4	14.6	.0	.0	.0	.0	.0	.0	.0

THOMPSON CREEK / STEADY SEEPAGE / LANDSIDE / STATIC - WEST LEVEE

Ten Most Critical. C:SSLSS6W.PLT By: STAN KLINE 04-20-99 6:06pm



#	FS
a	1.41
b	1.44
c	1.45
d	1.46
e	1.47
f	1.47
g	1.50
h	1.51
i	1.51
j	1.52

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	50	25	0	0	W1
FOUND	2	120	120	100	20	0	0	W1

PCSTABL5M/SI FSmin = 1.41 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

```
                          ** PCSTABL5M **

                                by
                          Purdue University
--------------------------------------------------------------------------------

                    --Slope Stability Analysis--
                 Simplified Janbu, Simplified Bishop
                    or Spencer's Method of Slices


        Run Date:                  04-20-99
        Time of Run:               6:06pm
        Run By:                    STAN KLINE
        Input Data Filename:       C:SSLSS6W.IN
        Output Filename:           C:SSLSS6W.OUT
        Unit:
        Plotted Output Filename:   C:SSLSS6W.PLT



        PROBLEM DESCRIPTION    THOMPSON CREEK / STEADY SEEPAGE /
                               LANDSIDE / STATIC - WEST LEVEE



        BOUNDARY COORDINATES

            5 Top   Boundaries
            6 Total Boundaries

        Boundary     X-Left     Y-Left    X-Right     Y-Right     Soil Type
           No.       (ft,m)     (ft,m)     (ft,m)      (ft,m)     Below Bnd

            1           .00      50.00     100.00       50.00         2
            2        100.00      50.00     120.00       60.00         1
            3        120.00      60.00     135.00       60.00         1
            4        135.00      60.00     155.00       50.00         1
            5        155.00      50.00     200.00       50.00         2
            6        100.00      50.00     155.00       50.00         2
--------------------------------------------------------------------------------


       ISOTROPIC SOIL PARAMETERS


         2 Type(s) of Soil


        Soil  Total  Saturated  Cohesion Friction   Pore    Pressure   Piez.
        Type Unit Wt. Unit Wt. Intercept  Angle   Pressure  Constant  Surface
         No.     (pcf,KN/m3)    (psf,KPa)  (deg)    Param.  (psf,KPa)    No.

          1   130.0    130.0      50.0     25.0      .00        .0        1
          2   120.0    120.0     100.0     20.0      .00        .0        1
```

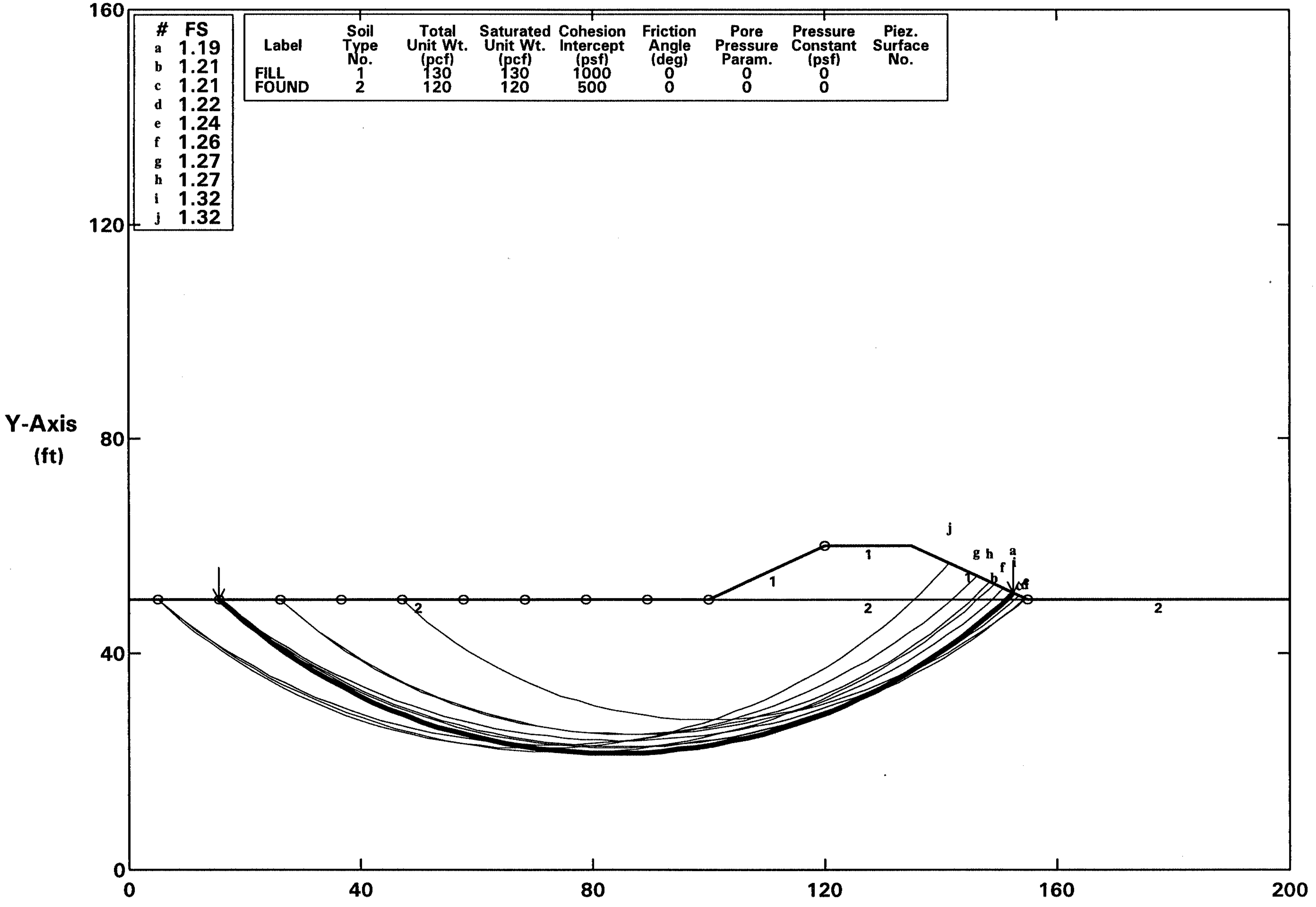
```
--------------------------------------------------------------------------------

        1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED


        Unit Weight of Water =  62.40


        Piezometric Surface No.  1 Specified by  4 Coordinate Points

          Point       X-Water      Y-Water
           No.         (ft,m)       (ft,m)

            1            .00        50.00
            2         100.00        50.00
            3         135.00        57.00
            4         200.00        57.00
--------------------------------------------------------------------------------

        A Critical Failure Surface Searching Method, Using A Random
        Technique For Generating Circular Surfaces, Has Been Specified.


        100 Trial Surfaces Have Been Generated.


         10 Surfaces Initiate From Each Of 10 Points Equally Spaced
        Along The Ground Surface Between  X =  70.00 (ft,m)
                                     and  X = 100.00 (ft,m)


        Each Surface Terminates Between   X = 120.00 (ft,m)
                                    and   X = 145.00 (ft,m)


        Unless Further Limitations Were Imposed, The Minimum Elevation
        At Which A Surface Extends Is  Y = 20.00 (ft,m)


         1.00 (ft,m) Line Segments Define Each Trial Failure Surface.


--------------------------------------------------------------------------------

        Following Are Displayed The Ten Most Critical Of The Trial
        Failure Surfaces Examined.  They Are Ordered - Most Critical
        First.


        * * Safety Factors Are Calculated By The Modified Bishop Method * *



        Failure Surface Specified By 34 Coordinate Points
```

```
         Point       X-Surf       Y-Surf
          No.        (ft,m)       (ft,m)

           1          96.67        50.00
           2          97.58        49.59
           3          98.51        49.23
           4          99.46        48.92
           5         100.43        48.65
           6         101.40        48.43
           7         102.39        48.26
           8         103.38        48.14
           9         104.38        48.06
          10         105.38        48.04
          11         106.38        48.06
          12         107.37        48.13
          13         108.37        48.25
          14         109.35        48.42
          15         110.33        48.63
          16         111.29        48.90
          17         112.24        49.21
          18         113.18        49.56
          19         114.09        49.96
          20         114.99        50.41
          21         115.86        50.90
          22         116.71        51.43
          23         117.53        52.00
          24         118.32        52.61
          25         119.08        53.26
          26         119.81        53.95
          27         120.50        54.67
          28         121.16        55.42
          29         121.78        56.20
          30         122.36        57.02
          31         122.91        57.86
          32         123.40        58.73
          33         123.86        59.62
          34         124.03        60.00

      Circle Center At X =   105.4 ; Y =    68.5  and Radius,    20.5

            ***     1.409   ***



             Individual data on the     37  slices

                          Water   Water      Tie     Tie     Earthquake
                          Force   Force     Force   Force       Force   Surcharge
Slice  Width    Weight     Top     Bot      Norm     Tan      Hor     Ver     Load
 No.  (ft,m)  (lbs,kg) (lbs,N) (lbs,N)  (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N)
  1       .9      22.2      .0    12.6       .0      .0      .0      .0      .0
  2       .9      65.5      .0    36.5       .0      .0      .0      .0      .0
  3       .9     105.1      .0    57.5       .0      .0      .0      .0      .0
```

4	.5	74.2	.0	40.1	.0	.0	.0	.0	.0
5	.4	72.0	.0	36.1	.0	.0	.0	.0	.0
6	1.0	228.5	.0	100.3	.0	.0	.0	.0	.0
7	1.0	316.7	.0	124.3	.0	.0	.0	.0	.0
8	1.0	400.4	.0	145.5	.0	.0	.0	.0	.0
9	1.0	478.8	.0	163.8	.0	.0	.0	.0	.0
10	1.0	550.9	.0	179.1	.0	.0	.0	.0	.0
11	1.0	616.2	.0	191.5	.0	.0	.0	.0	.0
12	1.0	673.9	.0	200.8	.0	.0	.0	.0	.0
13	1.0	723.6	.0	207.1	.0	.0	.0	.0	.0
14	1.0	764.9	.0	210.4	.0	.0	.0	.0	.0
15	1.0	797.3	.0	210.7	.0	.0	.0	.0	.0
16	1.0	820.9	.0	207.9	.0	.0	.0	.0	.0
17	1.0	835.4	.0	202.1	.0	.0	.0	.0	.0
18	.9	841.0	.0	193.2	.0	.0	.0	.0	.0
19	.9	837.7	.0	181.3	.0	.0	.0	.0	.0
20	.1	64.7	.0	13.7	.0	.0	.0	.0	.0
21	.8	759.6	.0	152.8	.0	.0	.0	.0	.0
22	.9	800.4	.0	148.7	.0	.0	.0	.0	.0
23	.8	768.7	.0	128.0	.0	.0	.0	.0	.0
24	.8	730.0	.0	104.5	.0	.0	.0	.0	.0
25	.8	684.9	.0	78.2	.0	.0	.0	.0	.0
26	.8	634.3	.0	49.1	.0	.0	.0	.0	.0
27	.7	579.2	.0	17.4	.0	.0	.0	.0	.0
28	.0	13.5	.0	.0	.0	.0	.0	.0	.0
29	.2	131.7	.0	.0	.0	.0	.0	.0	.0
30	.5	367.1	.0	.0	.0	.0	.0	.0	.0
31	.7	423.9	.0	.0	.0	.0	.0	.0	.0
32	.6	337.7	.0	.0	.0	.0	.0	.0	.0
33	.6	256.1	.0	.0	.0	.0	.0	.0	.0
34	.5	180.1	.0	.0	.0	.0	.0	.0	.0
35	.5	110.8	.0	.0	.0	.0	.0	.0	.0
36	.5	49.2	.0	.0	.0	.0	.0	.0	.0
37	.2	4.3	.0	.0	.0	.0	.0	.0	.0

THOMPSON CREEK / END OF CONSTRUCTION / WATERSIDE / EARTHQUAKE - WEST LEVEE

Ten Most Critical. C:ECWSE5W.PLT By: STAN KLINE 04-20-99 6:11pm



#	FS
a	1.19
b	1.21
c	1.21
d	1.22
e	1.24
f	1.26
g	1.27
h	1.27
i	1.32
j	1.32

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	1000	0	0	0	
FOUND	2	120	120	500	0	0	0	

PCSTABL5M/SI FSmin = 1.19 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

```
                         ** PCSTABL5M **

                               by
                        Purdue University
--------------------------------------------------------------------------------

                   --Slope Stability Analysis--
               Simplified Janbu, Simplified Bishop
                  or Spencer's Method of Slices


          Run Date:                 04-20-99
          Time of Run:              6:11pm
          Run By:                   STAN KLINE
          Input Data Filename:      C:ECWSE5W.IN
          Output Filename:          C:ECWSE5W.OUT
          Unit:
          Plotted Output Filename:  C:ECWSE5W.PLT



          PROBLEM DESCRIPTION   THOMPSON CREEK / END OF CONSTRUCTION /
                                WATERSIDE / EARTHQUAKE - WEST LEVEE



          BOUNDARY COORDINATES

              5 Top   Boundaries
              6 Total Boundaries

          Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
             No.       (ft,m)     (ft,m)      (ft,m)      (ft,m)     Below Bnd

              1           .00      50.00      100.00       50.00          2
              2        100.00      50.00      120.00       60.00          1
              3        120.00      60.00      135.00       60.00          1
              4        135.00      60.00      155.00       50.00          1
              5        155.00      50.00      200.00       50.00          2
              6        100.00      50.00      155.00       50.00          2
--------------------------------------------------------------------------------


         ISOTROPIC SOIL PARAMETERS


           2 Type(s) of Soil


          Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
          Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant  Surface
           No.    (pcf,KN/m3)    (psf,KPa)  (deg)   Param. (psf,KPa)    No.

            1   130.0    130.0    1000.0       .0     .00       .0       0
            2   120.0    120.0     500.0       .0     .00       .0       0
```

```
        A Horizontal Earthquake Loading Coefficient
        Of .150 Has Been Assigned

        A Vertical Earthquake Loading Coefficient
        Of .000 Has Been Assigned

        Cavitation Pressure =     .0 (psf,KPa)
--------------------------------------------------------------------------------


        A Critical Failure Surface Searching Method, Using A Random
        Technique For Generating Circular Surfaces, Has Been Specified.


        100 Trial Surfaces Have Been Generated.


         10 Surfaces Initiate From Each Of 10 Points Equally Spaced
        Along The Ground Surface Between  X =    5.00 (ft,m)
                                     and  X = 100.00 (ft,m)


        Each Surface Terminates Between   X = 120.00 (ft,m)
                                    and   X = 155.00 (ft,m)


        Unless Further Limitations Were Imposed, The Minimum Elevation
        At Which A Surface Extends Is  Y = 20.00 (ft,m)


         3.00 (ft,m) Line Segments Define Each Trial Failure Surface.


--------------------------------------------------------------------------------

        Following Are Displayed The Ten Most Critical Of The Trial
        Failure Surfaces Examined.  They Are Ordered - Most Critical
        First.


        * * Safety Factors Are Calculated By The Modified Bishop Method * *



        Failure Surface Specified By 52 Coordinate Points


          Point        X-Surf       Y-Surf
           No.         (ft,m)       (ft,m)

            1           15.56        50.00
            2           17.69        47.89
            3           19.89        45.85
            4           22.15        43.88
            5           24.47        41.98
```

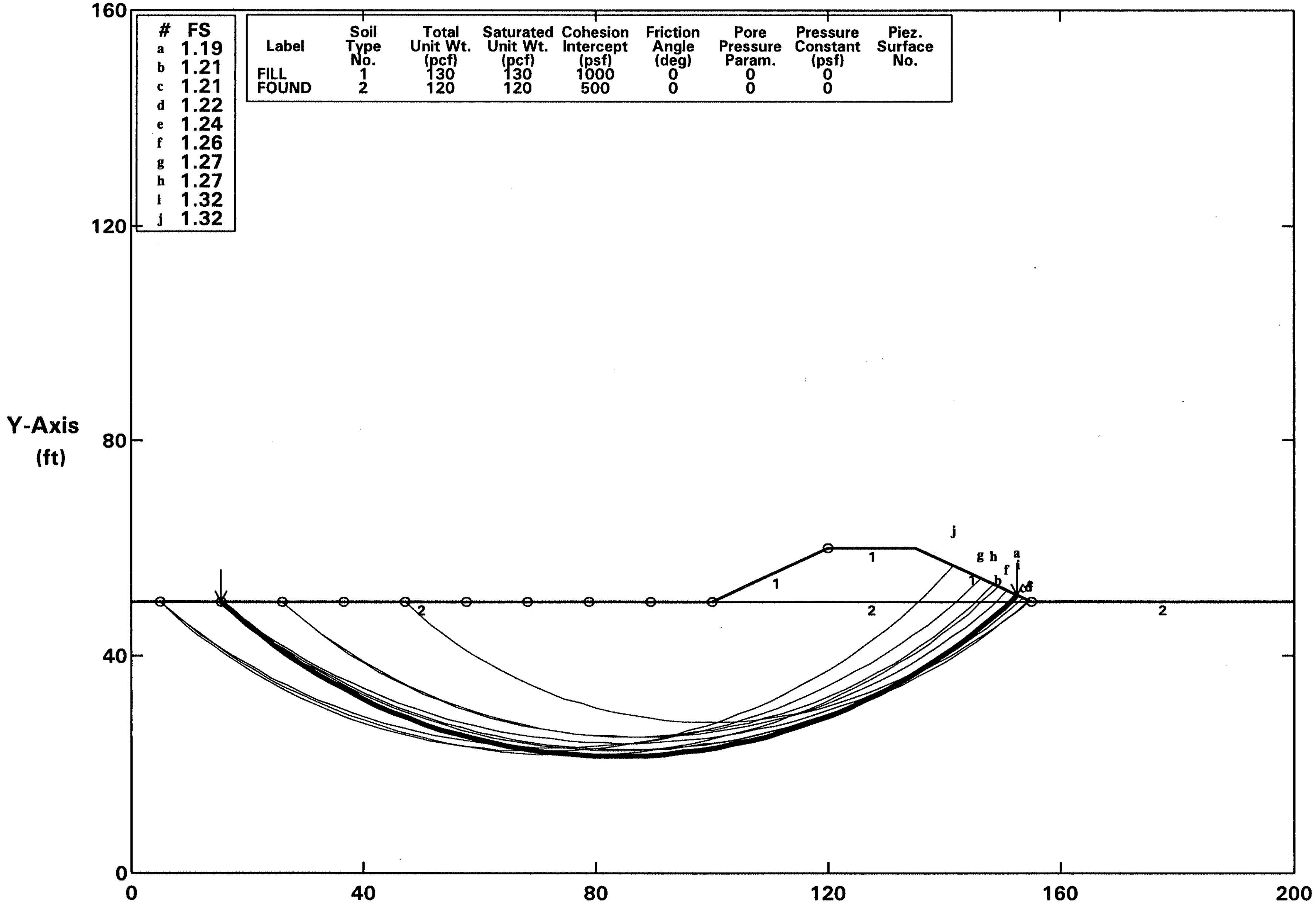
```
     6          26.85        40.15
     7          29.29        38.40
     8          31.78        36.73
     9          34.32        35.14
    10          36.92        33.63
    11          39.55        32.20
    12          42.24        30.86
    13          44.96        29.60
    14          47.72        28.43
    15          50.52        27.35
    16          53.35        26.35
    17          56.21        25.45
    18          59.10        24.63
    19          62.01        23.91
    20          64.94        23.28
    21          67.89        22.74
    22          70.86        22.30
    23          73.84        21.95
    24          76.83        21.69
    25          79.82        21.53
    26          82.82        21.46
    27          85.82        21.49
    28          88.82        21.61
    29          91.81        21.83
    30          94.80        22.14
    31          97.77        22.55
    32         100.73        23.05
    33         103.67        23.64
    34         106.59        24.32
    35         109.49        25.10
    36         112.36        25.97
    37         115.20        26.93
    38         118.01        27.97
    39         120.79        29.11
    40         123.53        30.33
    41         126.23        31.64
    42         128.88        33.03
    43         131.50        34.51
    44         134.06        36.07
    45         136.57        37.71
    46         139.03        39.42
    47         141.44        41.22
    48         143.78        43.09
    49         146.07        45.03
    50         148.30        47.04
    51         150.45        49.12
    52         152.52        51.24

Circle Center At X =   83.4 ; Y =  116.5  and Radius,   95.0

      ***     1.193   ***


     Individual data on the    55  slices
```

Slice No.	Width (ft,m)	Weight (lbs,kg)	Water Force Top (lbs,N)	Water Force Bot (lbs,N)	Tie Force Norm (lbs,N)	Tie Force Tan (lbs,N)	Earthquake Force Hor (lbs,N)	Earthquake Force Ver (lbs,N)	Surcharge Load (lbs,N)
1	2.1	270.0	.0	.0	.0	.0	40.5	.0	.0
2	2.2	825.8	.0	.0	.0	.0	123.9	.0	.0
3	2.3	1394.2	.0	.0	.0	.0	209.1	.0	.0
4	2.3	1971.2	.0	.0	.0	.0	295.7	.0	.0
5	2.4	2553.1	.0	.0	.0	.0	383.0	.0	.0
6	2.4	3136.3	.0	.0	.0	.0	470.4	.0	.0
7	2.5	3717.0	.0	.0	.0	.0	557.5	.0	.0
8	2.5	4291.6	.0	.0	.0	.0	643.7	.0	.0
9	2.6	4856.6	.0	.0	.0	.0	728.5	.0	.0
10	2.6	5408.7	.0	.0	.0	.0	811.3	.0	.0
11	2.7	5944.4	.0	.0	.0	.0	891.7	.0	.0
12	2.7	6460.6	.0	.0	.0	.0	969.1	.0	.0
13	2.8	6954.3	.0	.0	.0	.0	1043.1	.0	.0
14	2.8	7422.6	.0	.0	.0	.0	1113.4	.0	.0
15	2.8	7862.7	.0	.0	.0	.0	1179.4	.0	.0
16	2.9	8272.1	.0	.0	.0	.0	1240.8	.0	.0
17	2.9	8648.6	.0	.0	.0	.0	1297.3	.0	.0
18	2.9	8989.8	.0	.0	.0	.0	1348.5	.0	.0
19	2.9	9294.0	.0	.0	.0	.0	1394.1	.0	.0
20	3.0	9559.3	.0	.0	.0	.0	1433.9	.0	.0
21	3.0	9784.3	.0	.0	.0	.0	1467.6	.0	.0
22	3.0	9967.7	.0	.0	.0	.0	1495.2	.0	.0
23	3.0	10108.4	.0	.0	.0	.0	1516.3	.0	.0
24	3.0	10205.8	.0	.0	.0	.0	1530.9	.0	.0
25	3.0	10259.1	.0	.0	.0	.0	1538.9	.0	.0
26	3.0	10268.3	.0	.0	.0	.0	1540.2	.0	.0
27	3.0	10233.1	.0	.0	.0	.0	1535.0	.0	.0
28	3.0	10153.7	.0	.0	.0	.0	1523.1	.0	.0
29	3.0	10030.8	.0	.0	.0	.0	1504.6	.0	.0
30	3.0	9864.8	.0	.0	.0	.0	1479.7	.0	.0
31	2.2	7299.9	.0	.0	.0	.0	1095.0	.0	.0
32	.7	2374.0	.0	.0	.0	.0	356.1	.0	.0
33	2.9	9827.9	.0	.0	.0	.0	1474.2	.0	.0
34	2.9	10093.1	.0	.0	.0	.0	1514.0	.0	.0
35	2.9	10307.1	.0	.0	.0	.0	1546.1	.0	.0
36	2.9	10469.8	.0	.0	.0	.0	1570.5	.0	.0
37	2.8	10581.1	.0	.0	.0	.0	1587.2	.0	.0
38	2.8	10641.5	.0	.0	.0	.0	1596.2	.0	.0
39	2.0	7613.2	.0	.0	.0	.0	1142.0	.0	.0
40	.8	3018.2	.0	.0	.0	.0	452.7	.0	.0
41	2.7	10227.8	.0	.0	.0	.0	1534.2	.0	.0
42	2.7	9668.5	.0	.0	.0	.0	1450.3	.0	.0
43	2.7	9085.0	.0	.0	.0	.0	1362.7	.0	.0
44	2.6	8480.3	.0	.0	.0	.0	1272.1	.0	.0
45	2.6	7857.9	.0	.0	.0	.0	1178.7	.0	.0
46	.9	2759.7	.0	.0	.0	.0	414.0	.0	.0
47	1.6	4381.1	.0	.0	.0	.0	657.2	.0	.0
48	2.5	6125.5	.0	.0	.0	.0	918.8	.0	.0
49	2.4	5100.8	.0	.0	.0	.0	765.1	.0	.0
50	2.3	4100.0	.0	.0	.0	.0	615.0	.0	.0
51	2.3	3127.6	.0	.0	.0	.0	469.1	.0	.0
52	2.2	2188.3	.0	.0	.0	.0	328.2	.0	.0
53	2.2	1286.3	.0	.0	.0	.0	193.0	.0	.0

54	.9	273.1	.0	.0	.0	.0	41.0	.0	.0
55	1.2	145.1	.0	.0	.0	.0	21.8	.0	.0

THOMPSON CREEK / END OF CONSTRUCTION / LANDSIDE / EARTHQUAKE - WEST LEVEE

Ten Most Critical. C:ECLSE5W.PLT By: STAN KLINE 04-20-99 6:14pm



#	FS
a	1.19
b	1.21
c	1.21
d	1.22
e	1.24
f	1.26
g	1.27
h	1.27
i	1.32
j	1.32

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	1000	0	0	0	
FOUND	2	120	120	500	0	0	0	

PCSTABL5M/SI FSmin = 1.19 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

```
                              ** PCSTABL5M **

                                    by
                             Purdue University
--------------------------------------------------------------------------------

                       --Slope Stability Analysis--
                    Simplified Janbu, Simplified Bishop
                       or Spencer's Method of Slices


          Run Date:                  04-20-99
          Time of Run:               6:14pm
          Run By:                    STAN KLINE
          Input Data Filename:       C:ECLSE5W.IN
          Output Filename:           C:ECLSE5W.OUT
          Unit:
          Plotted Output Filename:   C:ECLSE5W.PLT



          PROBLEM DESCRIPTION   THOMPSON CREEK / END OF CONSTRUCTION /
                                LANDSIDE / EARTHQUAKE - WEST LEVEE



          BOUNDARY COORDINATES

              5 Top   Boundaries
              6 Total Boundaries

          Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
             No.       (ft,m)     (ft,m)      (ft,m)      (ft,m)     Below Bnd

              1           .00      50.00      100.00       50.00         2
              2        100.00      50.00      120.00       60.00         1
              3        120.00      60.00      135.00       60.00         1
              4        135.00      60.00      155.00       50.00         1
              5        155.00      50.00      200.00       50.00         2
              6        100.00      50.00      155.00       50.00         2
--------------------------------------------------------------------------------


         ISOTROPIC SOIL PARAMETERS


           2 Type(s) of Soil


          Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
          Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
           No.    (pcf,KN/m3)     (psf,KPa)  (deg)   Param. (psf,KPa)    No.

            1   130.0     130.0    1000.0       .0      .00        .0      0
            2   120.0     120.0     500.0       .0      .00        .0      0
```

```
A Horizontal Earthquake Loading Coefficient
Of .150 Has Been Assigned

A Vertical Earthquake Loading Coefficient
Of .000 Has Been Assigned

Cavitation Pressure =     .0 (psf,KPa)
------------------------------------------------------------------------------


A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.


100 Trial Surfaces Have Been Generated.


 10 Surfaces Initiate From Each Of 10 Points Equally Spaced
Along The Ground Surface Between  X =   5.00 (ft,m)
                             and  X = 100.00 (ft,m)


Each Surface Terminates Between   X = 120.00 (ft,m)
                            and   X = 155.00 (ft,m)


Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is  Y = 20.00 (ft,m)


 3.00 (ft,m) Line Segments Define Each Trial Failure Surface.


-----------------------------------------------------------------------------

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined.  They Are Ordered - Most Critical
First.


* * Safety Factors Are Calculated By The Modified Bishop Method * *


Failure Surface Specified By 52 Coordinate Points


  Point       X-Surf       Y-Surf
   No.        (ft,m)       (ft,m)

    1          15.56        50.00
    2          17.69        47.89
    3          19.89        45.85
    4          22.15        43.88
    5          24.47        41.98
```

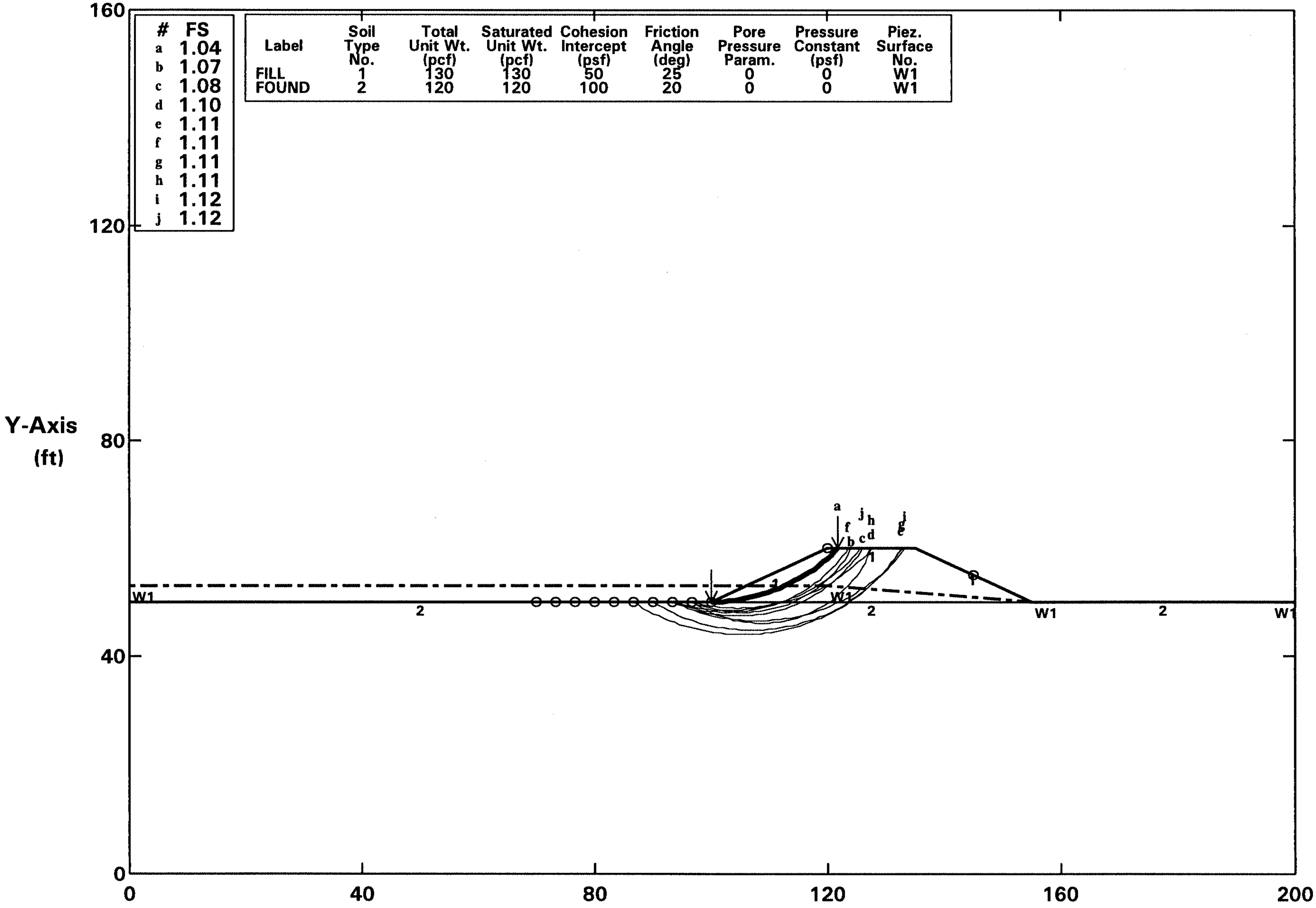
```
     6          26.85        40.15
     7          29.29        38.40
     8          31.78        36.73
     9          34.32        35.14
    10          36.92        33.63
    11          39.55        32.20
    12          42.24        30.86
    13          44.96        29.60
    14          47.72        28.43
    15          50.52        27.35
    16          53.35        26.35
    17          56.21        25.45
    18          59.10        24.63
    19          62.01        23.91
    20          64.94        23.28
    21          67.89        22.74
    22          70.86        22.30
    23          73.84        21.95
    24          76.83        21.69
    25          79.82        21.53
    26          82.82        21.46
    27          85.82        21.49
    28          88.82        21.61
    29          91.81        21.83
    30          94.80        22.14
    31          97.77        22.55
    32         100.73        23.05
    33         103.67        23.64
    34         106.59        24.32
    35         109.49        25.10
    36         112.36        25.97
    37         115.20        26.93
    38         118.01        27.97
    39         120.79        29.11
    40         123.53        30.33
    41         126.23        31.64
    42         128.88        33.03
    43         131.50        34.51
    44         134.06        36.07
    45         136.57        37.71
    46         139.03        39.42
    47         141.44        41.22
    48         143.78        43.09
    49         146.07        45.03
    50         148.30        47.04
    51         150.45        49.12
    52         152.52        51.24

Circle Center At X =   83.4 ; Y =  116.5  and Radius,   95.0


      ***     1.193   ***



     Individual data on the    55  slices
```

Slice No.	Width (ft,m)	Weight (lbs,kg)	Water Force Top (lbs,N)	Water Force Bot (lbs,N)	Tie Force Norm (lbs,N)	Tie Force Tan (lbs,N)	Earthquake Force Hor (lbs,N)	Earthquake Force Ver (lbs,N)	Surcharge Load (lbs,N)
1	2.1	270.0	.0	.0	.0	.0	40.5	.0	.0
2	2.2	825.8	.0	.0	.0	.0	123.9	.0	.0
3	2.3	1394.2	.0	.0	.0	.0	209.1	.0	.0
4	2.3	1971.2	.0	.0	.0	.0	295.7	.0	.0
5	2.4	2553.1	.0	.0	.0	.0	383.0	.0	.0
6	2.4	3136.3	.0	.0	.0	.0	470.4	.0	.0
7	2.5	3717.0	.0	.0	.0	.0	557.5	.0	.0
8	2.5	4291.6	.0	.0	.0	.0	643.7	.0	.0
9	2.6	4856.6	.0	.0	.0	.0	728.5	.0	.0
10	2.6	5408.7	.0	.0	.0	.0	811.3	.0	.0
11	2.7	5944.4	.0	.0	.0	.0	891.7	.0	.0
12	2.7	6460.6	.0	.0	.0	.0	969.1	.0	.0
13	2.8	6954.3	.0	.0	.0	.0	1043.1	.0	.0
14	2.8	7422.6	.0	.0	.0	.0	1113.4	.0	.0
15	2.8	7862.7	.0	.0	.0	.0	1179.4	.0	.0
16	2.9	8272.1	.0	.0	.0	.0	1240.8	.0	.0
17	2.9	8648.6	.0	.0	.0	.0	1297.3	.0	.0
18	2.9	8989.8	.0	.0	.0	.0	1348.5	.0	.0
19	2.9	9294.0	.0	.0	.0	.0	1394.1	.0	.0
20	3.0	9559.3	.0	.0	.0	.0	1433.9	.0	.0
21	3.0	9784.3	.0	.0	.0	.0	1467.6	.0	.0
22	3.0	9967.7	.0	.0	.0	.0	1495.2	.0	.0
23	3.0	10108.4	.0	.0	.0	.0	1516.3	.0	.0
24	3.0	10205.8	.0	.0	.0	.0	1530.9	.0	.0
25	3.0	10259.1	.0	.0	.0	.0	1538.9	.0	.0
26	3.0	10268.3	.0	.0	.0	.0	1540.2	.0	.0
27	3.0	10233.1	.0	.0	.0	.0	1535.0	.0	.0
28	3.0	10153.7	.0	.0	.0	.0	1523.1	.0	.0
29	3.0	10030.8	.0	.0	.0	.0	1504.6	.0	.0
30	3.0	9864.8	.0	.0	.0	.0	1479.7	.0	.0
31	2.2	7299.9	.0	.0	.0	.0	1095.0	.0	.0
32	.7	2374.0	.0	.0	.0	.0	356.1	.0	.0
33	2.9	9827.9	.0	.0	.0	.0	1474.2	.0	.0
34	2.9	10093.1	.0	.0	.0	.0	1514.0	.0	.0
35	2.9	10307.1	.0	.0	.0	.0	1546.1	.0	.0
36	2.9	10469.8	.0	.0	.0	.0	1570.5	.0	.0
37	2.8	10581.1	.0	.0	.0	.0	1587.2	.0	.0
38	2.8	10641.5	.0	.0	.0	.0	1596.2	.0	.0
39	2.0	7613.2	.0	.0	.0	.0	1142.0	.0	.0
40	.8	3018.2	.0	.0	.0	.0	452.7	.0	.0
41	2.7	10227.8	.0	.0	.0	.0	1534.2	.0	.0
42	2.7	9668.5	.0	.0	.0	.0	1450.3	.0	.0
43	2.7	9085.0	.0	.0	.0	.0	1362.7	.0	.0
44	2.6	8480.3	.0	.0	.0	.0	1272.1	.0	.0
45	2.6	7857.9	.0	.0	.0	.0	1178.7	.0	.0
46	.9	2759.7	.0	.0	.0	.0	414.0	.0	.0
47	1.6	4381.1	.0	.0	.0	.0	657.2	.0	.0
48	2.5	6125.5	.0	.0	.0	.0	918.8	.0	.0
49	2.4	5100.8	.0	.0	.0	.0	765.1	.0	.0
50	2.3	4100.0	.0	.0	.0	.0	615.0	.0	.0
51	2.3	3127.6	.0	.0	.0	.0	469.1	.0	.0
52	2.2	2188.3	.0	.0	.0	.0	328.2	.0	.0
53	2.2	1286.3	.0	.0	.0	.0	193.0	.0	.0

54	.9	273.1	.0	.0	.0	.0	41.0	.0	.0
55	1.2	145.1	.0	.0	.0	.0	21.8	.0	.0

THOMPSON CREEK / INTERMEDIATE STAGE / WATERSIDE / EARTHQUAKE - WEST LEVEE

Ten Most Critical. C:ISWSE8W.PLT By: STAN KLINE 04-20-99 6:17pm



#	FS
a	1.04
b	1.07
c	1.08
d	1.10
e	1.11
f	1.11
g	1.11
h	1.11
i	1.12
j	1.12

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	50	25	0	0	W1
FOUND	2	120	120	100	20	0	0	W1

PCSTABL5M/SI FSmin=1.04 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

```
                              ** PCSTABL5M **

                                    by
                             Purdue University
------------------------------------------------------------------------------

                       --Slope Stability Analysis--
                    Simplified Janbu, Simplified Bishop
                       or Spencer's Method of Slices


          Run Date:                 04-20-99
          Time of Run:              6:17pm
          Run By:                   STAN KLINE
          Input Data Filename:      C:ISWSE8W.IN
          Output Filename:          C:ISWSE8W.OUT
          Unit:
          Plotted Output Filename:  C:ISWSE8W.PLT



          PROBLEM DESCRIPTION   THOMPSON CREEK / INTERMEDIATE STAGE /
                                WATERSIDE / EARTHQUAKE - WEST LEVEE



          BOUNDARY COORDINATES

              5 Top   Boundaries
              6 Total Boundaries

          Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
             No.       (ft,m)     (ft,m)     (ft,m)     (ft,m)    Below Bnd

              1           .00      50.00     100.00      50.00        2
              2        100.00      50.00     120.00      60.00        1
              3        120.00      60.00     135.00      60.00        1
              4        135.00      60.00     155.00      50.00        1
              5        155.00      50.00     200.00      50.00        2
              6        100.00      50.00     155.00      50.00        2
------------------------------------------------------------------------------


         ISOTROPIC SOIL PARAMETERS


           2 Type(s) of Soil


          Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
          Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
           No.    (pcf,KN/m3)    (psf,KPa)   (deg)   Param. (psf,KPa)    No.

            1   130.0    130.0      50.0     25.0     .00        .0      1
            2   120.0    120.0     100.0     20.0     .00        .0      1
```

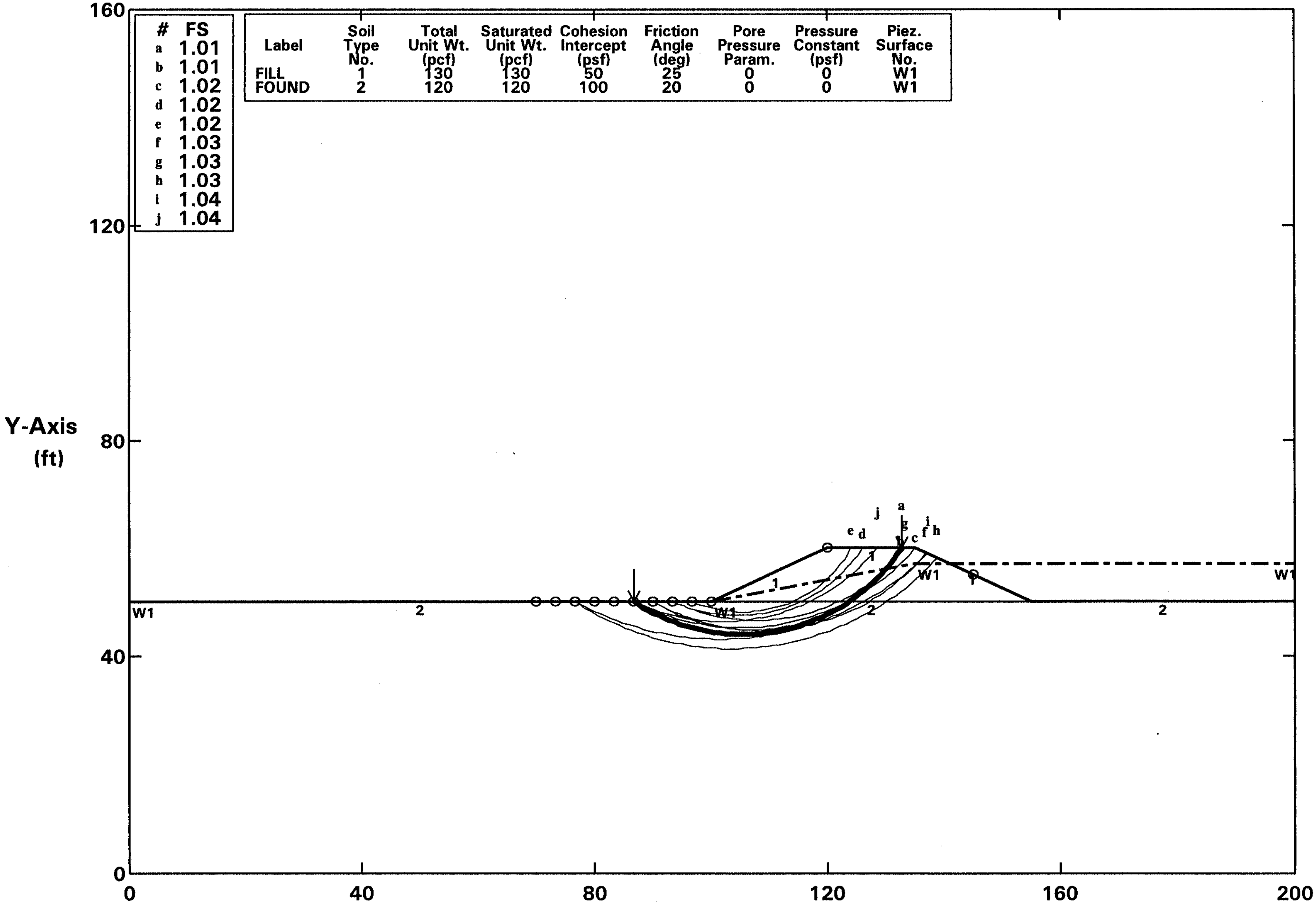
```
--------------------------------------------------------------------------------


          1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED


          Unit Weight of Water =  62.40


          Piezometric Surface No.  1 Specified by  4 Coordinate Points

            Point      X-Water     Y-Water
             No.        (ft,m)      (ft,m)

              1            .00       53.00
              2         120.00       53.00
              3         155.00       50.00
              4         200.00       50.00


          A Horizontal Earthquake Loading Coefficient
          Of .150 Has Been Assigned

          A Vertical Earthquake Loading Coefficient
          Of .000 Has Been Assigned

          Cavitation Pressure =     .0 (psf,KPa)
--------------------------------------------------------------------------------

          A Critical Failure Surface Searching Method, Using A Random
          Technique For Generating Circular Surfaces, Has Been Specified.


          100 Trial Surfaces Have Been Generated.


           10 Surfaces Initiate From Each Of 10 Points Equally Spaced
          Along The Ground Surface Between  X =  70.00 (ft,m)
                                      and  X = 100.00 (ft,m)


          Each Surface Terminates Between   X = 120.00 (ft,m)
                                     and   X = 145.00 (ft,m)


          Unless Further Limitations Were Imposed, The Minimum Elevation
          At Which A Surface Extends Is  Y = 20.00 (ft,m)


           1.00 (ft,m) Line Segments Define Each Trial Failure Surface.


--------------------------------------------------------------------------------
```

```
         Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.


         * * Safety Factors Are Calculated By The Modified Bishop Method * *


         Failure Surface Specified By 26 Coordinate Points


           Point      X-Surf      Y-Surf
            No.       (ft,m)      (ft,m)

             1        100.00       50.00
             2        101.00       50.03
             3        102.00       50.09
             4        102.99       50.18
             5        103.99       50.31
             6        104.97       50.47
             7        105.95       50.67
             8        106.93       50.90
             9        107.89       51.16
            10        108.85       51.46
            11        109.79       51.78
            12        110.72       52.14
            13        111.64       52.54
            14        112.55       52.96
            15        113.44       53.41
            16        114.32       53.89
            17        115.18       54.41
            18        116.02       54.95
            19        116.84       55.52
            20        117.64       56.12
            21        118.42       56.74
            22        119.18       57.39
            23        119.92       58.07
            24        120.63       58.77
            25        121.32       59.50
            26        121.76       60.00

         Circle Center At X =   99.7 ; Y =   79.3  and Radius,   29.3


              ***     1.039   ***


              Individual data on the     27  slices

                        Water  Water      Tie     Tie     Earthquake
                        Force  Force     Force   Force       Force   Surcharge
lice  Width   Weight    Top    Bot      Norm    Tan     Hor     Ver     Load
 No.  (ft,m) (lbs,kg) (lbs,N)(lbs,N)  (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N)
  1     1.0     30.7   191.8  186.3       .0      .0     4.6      .0      .0
```

2	1.0	89.8	156.7	183.6	.0	.0	13.5	.0	.0
3	1.0	144.0	121.7	178.8	.0	.0	21.6	.0	.0
4	1.0	193.1	86.8	171.8	.0	.0	29.0	.0	.0
5	1.0	236.9	52.4	162.7	.0	.0	35.5	.0	.0
6	1.0	275.2	18.4	151.5	.0	.0	41.3	.0	.0
7	1.0	308.1	.0	138.2	.0	.0	46.2	.0	.0
8	1.0	335.4	.0	122.9	.0	.0	50.3	.0	.0
9	1.0	357.1	.0	105.5	.0	.0	53.6	.0	.0
10	.9	373.2	.0	86.0	.0	.0	56.0	.0	.0
11	.9	383.8	.0	64.6	.0	.0	57.6	.0	.0
12	.9	389.1	.0	41.2	.0	.0	58.4	.0	.0
13	.9	389.1	.0	15.8	.0	.0	58.4	.0	.0
14	.1	35.4	.0	.1	.0	.0	5.3	.0	.0
15	.8	348.6	.0	.0	.0	.0	52.3	.0	.0
16	.9	374.1	.0	.0	.0	.0	56.1	.0	.0
17	.9	359.7	.0	.0	.0	.0	53.9	.0	.0
18	.8	340.9	.0	.0	.0	.0	51.1	.0	.0
19	.8	318.2	.0	.0	.0	.0	47.7	.0	.0
20	.8	291.9	.0	.0	.0	.0	43.8	.0	.0
21	.8	262.4	.0	.0	.0	.0	39.4	.0	.0
22	.8	230.2	.0	.0	.0	.0	34.5	.0	.0
23	.7	195.5	.0	.0	.0	.0	29.3	.0	.0
24	.1	20.3	.0	.0	.0	.0	3.1	.0	.0
25	.6	125.8	.0	.0	.0	.0	18.9	.0	.0
26	.7	77.5	.0	.0	.0	.0	11.6	.0	.0
27	.4	14.6	.0	.0	.0	.0	2.2	.0	.0

THOMPSON CREEK / STEADY SEEPAGE / LANDSIDE / EARTHQUAKE - WEST LEVEE

Ten Most Critical. C:SSLSE6W.PLT By: STAN KLINE 04-20-99 6:19pm



#	FS
a	1.01
b	1.01
c	1.02
d	1.02
e	1.02
f	1.03
g	1.03
h	1.03
i	1.04
j	1.04

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	50	25	0	0	W1
FOUND	2	120	120	100	20	0	0	W1

PCSTABL5M/SI FSmin = 1.01 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

```
                              ** PCSTABL5M **

                                    by
                             Purdue University
--------------------------------------------------------------------------------

                        --Slope Stability Analysis--
                    Simplified Janbu, Simplified Bishop
                       or Spencer's Method of Slices


          Run Date:                    04-20-99
          Time of Run:                 6:19pm
          Run By:                      STAN KLINE
          Input Data Filename:         C:SSLSE6W.IN
          Output Filename:             C:SSLSE6W.OUT
          Unit:
          Plotted Output Filename:     C:SSLSE6W.PLT



          PROBLEM DESCRIPTION   THOMPSON CREEK / STEADY SEEPAGE /
                                LANDSIDE / EARTHQUAKE - WEST LEVEE



          BOUNDARY COORDINATES

              5 Top   Boundaries
              6 Total Boundaries

          Boundary      X-Left     Y-Left    X-Right     Y-Right     Soil Type
             No.        (ft,m)     (ft,m)     (ft,m)      (ft,m)     Below Bnd

              1            .00      50.00     100.00       50.00         2
              2         100.00      50.00     120.00       60.00         1
              3         120.00      60.00     135.00       60.00         1
              4         135.00      60.00     155.00       50.00         1
              5         155.00      50.00     200.00       50.00         2
              6         100.00      50.00     155.00       50.00         2
--------------------------------------------------------------------------------


         ISOTROPIC SOIL PARAMETERS


           2 Type(s) of Soil


          Soil  Total  Saturated  Cohesion Friction    Pore   Pressure   Piez.
          Type Unit Wt. Unit Wt. Intercept   Angle   Pressure Constant  Surface
           No.    (pcf,KN/m3)     (psf,KPa)  (deg)    Param.  (psf,KPa)   No.

            1   130.0    130.0      50.0     25.0      .00        .0       1
            2   120.0    120.0     100.0     20.0      .00        .0       1
```

```
--------------------------------------------------------------------------------

         1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED


         Unit Weight of Water =  62.40


         Piezometric Surface No.  1 Specified by  4 Coordinate Points

           Point      X-Water     Y-Water
            No.        (ft,m)      (ft,m)

             1            .00       50.00
             2         100.00       50.00
             3         135.00       57.00
             4         200.00       57.00


         A Horizontal Earthquake Loading Coefficient
         Of .150 Has Been Assigned

         A Vertical Earthquake Loading Coefficient
         Of .000 Has Been Assigned

         Cavitation Pressure =     .0 (psf,KPa)
--------------------------------------------------------------------------------

         A Critical Failure Surface Searching Method, Using A Random
         Technique For Generating Circular Surfaces, Has Been Specified.


         100 Trial Surfaces Have Been Generated.


          10 Surfaces Initiate From Each Of 10 Points Equally Spaced
         Along The Ground Surface Between  X =  70.00 (ft,m)
                                      and  X = 100.00 (ft,m)


         Each Surface Terminates Between   X = 120.00 (ft,m)
                                     and   X = 145.00 (ft,m)


         Unless Further Limitations Were Imposed, The Minimum Elevation
         At Which A Surface Extends Is  Y = 20.00 (ft,m)


          1.00 (ft,m) Line Segments Define Each Trial Failure Surface.

  ------------------------------------------------------------------------------
```

```
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined.  They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *


Failure Surface Specified By 55 Coordinate Points

  Point        X-Surf        Y-Surf
   No.         (ft,m)        (ft,m)

    1           86.67         50.00
    2           87.48         49.42
    3           88.32         48.87
    4           89.17         48.35
    5           90.04         47.86
    6           90.93         47.39
    7           91.82         46.95
    8           92.74         46.54
    9           93.66         46.16
   10           94.60         45.80
   11           95.54         45.48
   12           96.50         45.19
   13           97.46         44.93
   14           98.44         44.70
   15           99.42         44.50
   16          100.40         44.33
   17          101.39         44.19
   18          102.39         44.08
   19          103.38         44.01
   20          104.38         43.96
   21          105.38         43.95
   22          106.38         43.97
   23          107.38         44.02
   24          108.38         44.11
   25          109.37         44.22
   26          110.36         44.37
   27          111.34         44.54
   28          112.32         44.75
   29          113.29         44.99
   30          114.26         45.26
   31          115.21         45.56
   32          116.15         45.89
   33          117.09         46.25
   34          118.01         46.64
   35          118.92         47.06
   36          119.81         47.51
   37          120.69         47.98
   38          121.56         48.48
   39          122.40         49.01
   40          123.23         49.57
   41          124.05         50.15
   42          124.84         50.76
   43          125.62         51.39
```

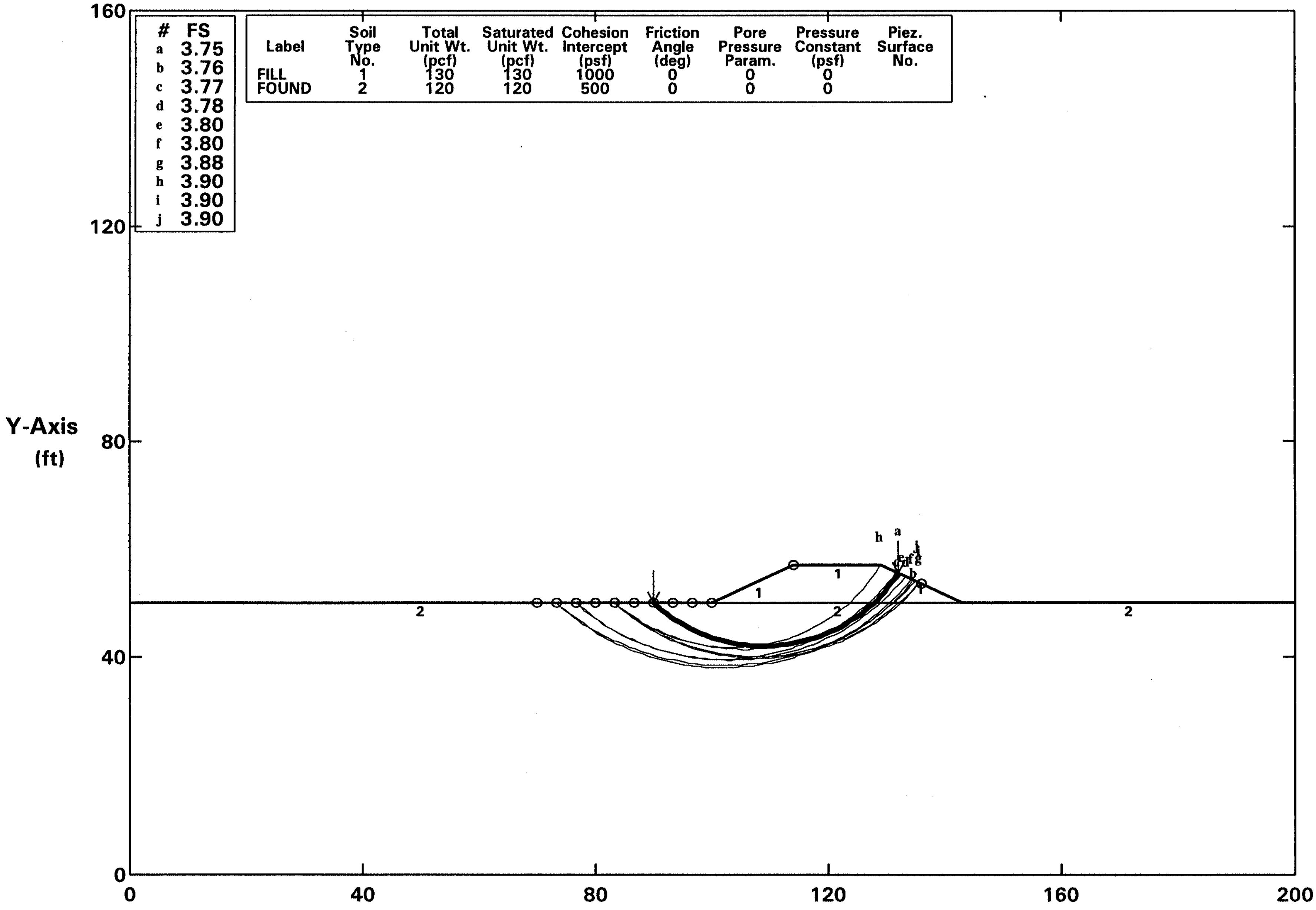
```
             44          126.37        52.05
             45          127.10        52.73
             46          127.81        53.43
             47          128.50        54.16
             48          129.17        54.91
             49          129.81        55.67
             50          130.42        56.46
             51          131.02        57.27
             52          131.58        58.09
             53          132.12        58.94
             54          132.63        59.79
             55          132.75        60.00

         Circle Center At X =  105.3 ; Y =   75.5  and Radius,   31.6


               ***     1.006   ***




               Individual data on the    58  slices


                         Water  Water      Tie     Tie     Earthquake
                         Force  Force     Force   Force       Force    Surcharge
Slice  Width    Weight    Top    Bot       Norm    Tan      Hor     Ver     Load
 No.   (ft,m)  (lbs,kg) (lbs,N) (lbs,N)  (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N)
  1       .8      28.2      .0     18.0       .0      .0     4.2      .0      .0
  2       .8      85.3      .0     53.1       .0      .0    12.8      .0      .0
  3       .9     141.8      .0     86.5       .0      .0    21.3      .0      .0
  4       .9     197.6      .0    118.3       .0      .0    29.6      .0      .0
  5       .9     252.2      .0    148.4       .0      .0    37.8      .0      .0
  6       .9     305.2      .0    176.7       .0      .0    45.8      .0      .0
  7       .9     356.2      .0    203.2       .0      .0    53.4      .0      .0
  8       .9     405.1      .0    227.9       .0      .0    60.8      .0      .0
  9       .9     451.4      .0    250.8       .0      .0    67.7      .0      .0
 10       .9     494.9      .0    271.9       .0      .0    74.2      .0      .0
 11      1.0     535.3      .0    291.1       .0      .0    80.3      .0      .0
 12      1.0     572.3      .0    308.4       .0      .0    85.8      .0      .0
 13      1.0     605.7      .0    323.8       .0      .0    90.9      .0      .0
 14      1.0     635.4      .0    337.2       .0      .0    95.3      .0      .0
 15       .6     389.5      .0    205.5       .0      .0    58.4      .0      .0
 16       .4     276.8      .0    141.5       .0      .0    41.5      .0      .0
 17      1.0     740.3      .0    362.4       .0      .0   111.0      .0      .0
 18      1.0     821.9      .0    382.1       .0      .0   123.3      .0      .0
 19      1.0     899.7      .0    399.8       .0      .0   135.0      .0      .0
 20      1.0     973.3      .0    415.7       .0      .0   146.0      .0      .0
 21      1.0    1042.4      .0    429.6       .0      .0   156.4      .0      .0
 22      1.0    1106.7      .0    441.6       .0      .0   166.0      .0      .0
 23      1.0    1166.1      .0    451.6       .0      .0   174.9      .0      .0
 24      1.0    1220.1      .0    459.7       .0      .0   183.0      .0      .0
 25      1.0    1268.8      .0    465.8       .0      .0   190.3      .0      .0
 26      1.0    1311.8      .0    470.0       .0      .0   196.8      .0      .0
 27      1.0    1349.0      .0    472.2       .0      .0   202.3      .0      .0
 28      1.0    1380.3      .0    472.4       .0      .0   207.1      .0      .0
 29      1.0    1405.8      .0    470.6       .0      .0   210.9      .0      .0
 30      1.0    1425.2      .0    466.8       .0      .0   213.8      .0      .0
```

31	1.0	1438.6	.0	461.1	.0	.0	215.8	.0	.0
32	.9	1446.1	.0	453.4	.0	.0	216.9	.0	.0
33	.9	1447.6	.0	443.8	.0	.0	217.1	.0	.0
34	.9	1443.2	.0	432.2	.0	.0	216.5	.0	.0
35	.9	1433.2	.0	418.7	.0	.0	215.0	.0	.0
36	.9	1417.5	.0	403.3	.0	.0	212.6	.0	.0
37	.2	300.6	.0	84.6	.0	.0	45.1	.0	.0
38	.7	1080.4	.0	301.3	.0	.0	162.1	.0	.0
39	.9	1307.1	.0	366.7	.0	.0	196.1	.0	.0
40	.8	1229.9	.0	345.6	.0	.0	184.5	.0	.0
41	.8	1150.8	.0	322.6	.0	.0	172.6	.0	.0
42	.6	794.4	.0	222.0	.0	.0	119.2	.0	.0
43	.2	275.7	.0	75.8	.0	.0	41.4	.0	.0
44	.8	985.1	.0	271.2	.0	.0	147.8	.0	.0
45	.8	898.3	.0	242.9	.0	.0	134.7	.0	.0
46	.8	811.4	.0	212.8	.0	.0	121.7	.0	.0
47	.7	724.9	.0	180.9	.0	.0	108.7	.0	.0
48	.7	639.3	.0	147.4	.0	.0	95.9	.0	.0
49	.7	555.0	.0	112.3	.0	.0	83.3	.0	.0
50	.7	472.6	.0	75.5	.0	.0	70.9	.0	.0
51	.6	392.5	.0	37.2	.0	.0	58.9	.0	.0
52	.3	144.1	.0	3.8	.0	.0	21.6	.0	.0
53	.3	170.9	.0	.0	.0	.0	25.6	.0	.0
54	.6	240.9	.0	.0	.0	.0	36.1	.0	.0
55	.6	170.5	.0	.0	.0	.0	25.6	.0	.0
56	.5	104.1	.0	.0	.0	.0	15.6	.0	.0
57	.5	42.3	.0	.0	.0	.0	6.3	.0	.0
58	.1	1.5	.0	.0	.0	.0	.2	.0	.0

EAST LEVEE

STABILITY ANALYSES

THOMPSON CREEK / END OF CONSTRUCTION / WATERSIDE / STATIC - EAST LEVEE
Ten Most Critical. C:ECWSS2E.PLT By: STAN KLINE 04-20-99 5:11pm



#	FS
a	3.75
b	3.76
c	3.77
d	3.78
e	3.80
f	3.80
g	3.88
h	3.90
i	3.90
j	3.90

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	1000	0	0	0	
FOUND	2	120	120	500	0	0	0	

PCSTABL5M/SI FSmin=3.75 X-Axis (ft)
Factors Of Safety Calculated By The Modified Bishop Method

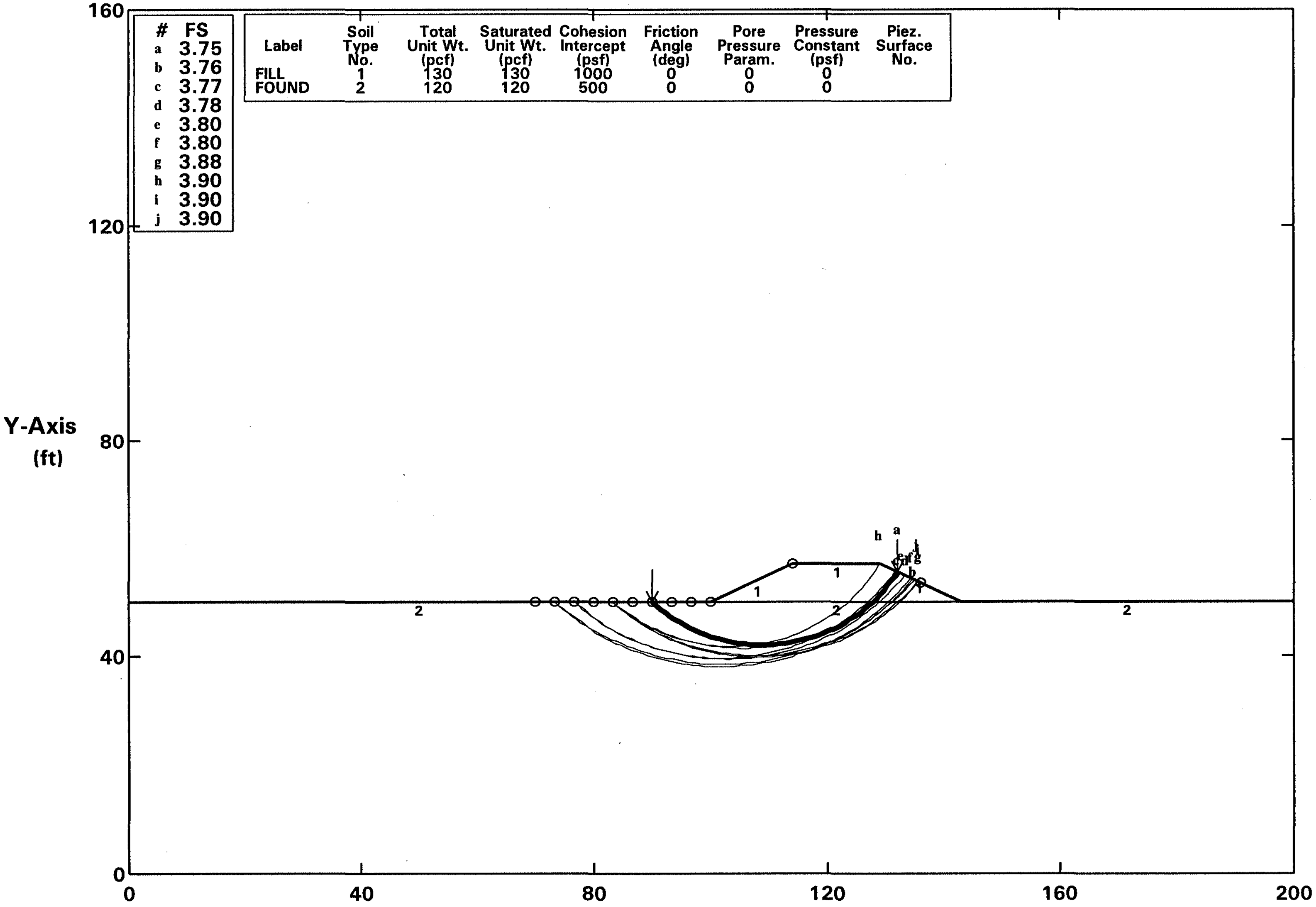
```
                              ** PCSTABL5M **

                                    by
                             Purdue University
--------------------------------------------------------------------------------

                       --Slope Stability Analysis--
                    Simplified Janbu, Simplified Bishop
                       or Spencer‘s Method of Slices


         Run Date:                  04-20-99
         Time of Run:               5:11pm
         Run By:                    STAN KLINE
         Input Data Filename:       C:ECWSS2E.IN
         Output Filename:           C:ECWSS2E.OUT
         Unit:
         Plotted Output Filename:   C:ECWSS2E.PLT



         PROBLEM DESCRIPTION   THOMPSON CREEK / END OF CONSTRUCTION /
                               WATERSIDE / STATIC - EAST LEVEE



         BOUNDARY COORDINATES

             5 Top   Boundaries
             6 Total Boundaries

         Boundary      X-Left     Y-Left     X-Right     Y-Right     Soil Type
            No.        (ft,m)     (ft,m)      (ft,m)      (ft,m)     Below Bnd

             1            .00      50.00      100.00       50.00         2
             2         100.00      50.00      114.00       57.00         1
             3         114.00      57.00      129.00       57.00         1
             4         129.00      57.00      143.00       50.00         1
             5         143.00      50.00      200.00       50.00         2
             6         100.00      50.00      143.00       50.00         2
--------------------------------------------------------------------------------


        ISOTROPIC SOIL PARAMETERS


          2 Type(s) of Soil


         Soil   Total  Saturated  Cohesion Friction    Pore   Pressure   Piez.
         Type Unit Wt. Unit Wt. Intercept   Angle   Pressure Constant  Surface
          No.    (pcf,KN/m3)     (psf,KPa)  (deg)    Param. (psf,KPa)    No.

           1   130.0     130.0    1000.0       .0      .00        .0      0
           2   120.0     120.0     500.0       .0      .00        .0      0
```

```
--------------------------------------------------------------------------------


      A Critical Failure Surface Searching Method, Using A Random
      Technique For Generating Circular Surfaces, Has Been Specified.


      100 Trial Surfaces Have Been Generated.


       10 Surfaces Initiate From Each Of 10 Points Equally Spaced
      Along The Ground Surface Between  X =  70.00 (ft,m)
                                  and   X = 100.00 (ft,m)


      Each Surface Terminates Between   X = 114.00 (ft,m)
                                 and    X = 136.00 (ft,m)


      Unless Further Limitations Were Imposed, The Minimum Elevation
      At Which A Surface Extends Is  Y = 20.00 (ft,m)


       1.00 (ft,m) Line Segments Define Each Trial Failure Surface.


--------------------------------------------------------------------------------

      Following Are Displayed The Ten Most Critical Of The Trial
      Failure Surfaces Examined.  They Are Ordered - Most Critical
      First.


      * * Safety Factors Are Calculated By The Modified Bishop Method * *


      Failure Surface Specified By 51 Coordinate Points


        Point      X-Surf      Y-Surf
         No.       (ft,m)      (ft,m)

          1         90.00       50.00
          2         90.71       49.30
          3         91.45       48.62
          4         92.21       47.97
          5         92.99       47.35
          6         93.80       46.76
          7         94.63       46.20
          8         95.48       45.68
          9         96.35       45.18
         10         97.24       44.72
         11         98.14       44.30
         12         99.06       43.91
         13        100.00       43.55
         14        100.95       43.23
         15        101.90       42.95
```

```
            16          102.87        42.70
            17          103.85        42.49
            18          104.84        42.31
            19          105.83        42.18
            20          106.82        42.08
            21          107.82        42.02
            22          108.82        42.00
            23          109.82        42.01
            24          110.82        42.06
            25          111.81        42.16
            26          112.80        42.28
            27          113.79        42.45
            28          114.77        42.65
            29          115.74        42.90
            30          116.70        43.17
            31          117.65        43.49
            32          118.59        43.84
            33          119.51        44.22
            34          120.42        44.64
            35          121.31        45.09
            36          122.18        45.58
            37          123.04        46.10
            38          123.87        46.65
            39          124.68        47.23
            40          125.47        47.85
            41          126.24        48.49
            42          126.98        49.16
            43          127.70        49.86
            44          128.38        50.59
            45          129.04        51.34
            46          129.67        52.11
            47          130.28        52.91
            48          130.85        53.74
            49          131.38        54.58
            50          131.89        55.44
            51          131.94        55.53

          Circle Center At X =  108.9 ; Y =   68.3  and Radius,   26.4


                ***     3.752   ***



               Individual data on the    54  slices


                         Water  Water      Tie      Tie     Earthquake
                         Force  Force     Force    Force       Force   Surcharge
Slice   Width   Weight    Top    Bot      Norm      Tan     Hor     Ver     Load
 No.   (ft,m) (lbs,kg) (lbs,N)(lbs,N)   (lbs,N)  (lbs,N) (lbs,N) (lbs,N) (lbs,N)
  1       .7     30.0      .0      .0       .0       .0      .0      .0      .0
  2       .7     92.1      .0      .0       .0       .0      .0      .0      .0
  3       .8    155.8      .0      .0       .0       .0      .0      .0      .0
  4       .8    220.5      .0      .0       .0       .0      .0      .0      .0
  5       .8    285.5      .0      .0       .0       .0      .0      .0      .0
  6       .8    350.3      .0      .0       .0       .0      .0      .0      .0
```

7	.9	414.3	.0	.0	.0	.0	.0	.0	.0	
8	.9	476.9	.0	.0	.0	.0	.0	.0	.0	
9	.9	537.6	.0	.0	.0	.0	.0	.0	.0	
10	.9	595.9	.0	.0	.0	.0	.0	.0	.0	
11	.9	651.2	.0	.0	.0	.0	.0	.0	.0	
12	.9	703.2	.0	.0	.0	.0	.0	.0	.0	
13	.0	1.5	.0	.0	.0	.0	.0	.0	.0	
14	.9	778.9	.0	.0	.0	.0	.0	.0	.0	
15	1.0	884.0	.0	.0	.0	.0	.0	.0	.0	
16	1.0	984.9	.0	.0	.0	.0	.0	.0	.0	
17	1.0	1082.5	.0	.0	.0	.0	.0	.0	.0	
18	1.0	1176.1	.0	.0	.0	.0	.0	.0	.0	
19	1.0	1265.1	.0	.0	.0	.0	.0	.0	.0	
20	1.0	1349.0	.0	.0	.0	.0	.0	.0	.0	
21	1.0	1427.3	.0	.0	.0	.0	.0	.0	.0	
22	1.0	1499.5	.0	.0	.0	.0	.0	.0	.0	
23	1.0	1565.1	.0	.0	.0	.0	.0	.0	.0	
24	1.0	1623.8	.0	.0	.0	.0	.0	.0	.0	
25	1.0	1675.3	.0	.0	.0	.0	.0	.0	.0	
26	1.0	1719.2	.0	.0	.0	.0	.0	.0	.0	
27	1.0	1755.5	.0	.0	.0	.0	.0	.0	.0	
28	.2	377.4	.0	.0	.0	.0	.0	.0	.0	
29	.8	1387.0	.0	.0	.0	.0	.0	.0	.0	
30	1.0	1724.8	.0	.0	.0	.0	.0	.0	.0	
31	1.0	1677.5	.0	.0	.0	.0	.0	.0	.0	
32	.9	1624.3	.0	.0	.0	.0	.0	.0	.0	
33	.9	1565.5	.0	.0	.0	.0	.0	.0	.0	
34	.9	1501.6	.0	.0	.0	.0	.0	.0	.0	
35	.9	1433.0	.0	.0	.0	.0	.0	.0	.0	
36	.9	1360.2	.0	.0	.0	.0	.0	.0	.0	
37	.9	1283.6	.0	.0	.0	.0	.0	.0	.0	
38	.9	1203.9	.0	.0	.0	.0	.0	.0	.0	
39	.8	1121.7	.0	.0	.0	.0	.0	.0	.0	
40	.8	1037.4	.0	.0	.0	.0	.0	.0	.0	
41	.8	951.7	.0	.0	.0	.0	.0	.0	.0	
42	.8	865.2	.0	.0	.0	.0	.0	.0	.0	
43	.7	778.6	.0	.0	.0	.0	.0	.0	.0	
44	.7	692.5	.0	.0	.0	.0	.0	.0	.0	
45	.1	120.6	.0	.0	.0	.0	.0	.0	.0	
46	.6	485.2	.0	.0	.0	.0	.0	.0	.0	
47	.6	485.6	.0	.0	.0	.0	.0	.0	.0	
48	.0	32.2	.0	.0	.0	.0	.0	.0	.0	
49	.6	417.8	.0	.0	.0	.0	.0	.0	.0	
50	.6	312.4	.0	.0	.0	.0	.0	.0	.0	
51	.6	214.6	.0	.0	.0	.0	.0	.0	.0	
52	.5	125.1	.0	.0	.0	.0	.0	.0	.0	
53	.5	44.2	.0	.0	.0	.0	.0	.0	.0	
54	.0	.4	.0	.0	.0	.0	.0	.0	.0	

THOMPSON CREEK / END OF CONSTRUCTION / LANDSIDE / STATIC - EAST LEVEE
Ten Most Critical. C:ECLSS2E.PLT By: STAN KLINE 04-20-99 5:14pm



#	FS
a	3.75
b	3.76
c	3.77
d	3.78
e	3.80
f	3.80
g	3.88
h	3.90
i	3.90
j	3.90

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	1000	0	0	0	
FOUND	2	120	120	500	0	0	0	

PCSTABL5M/SI FSmin = 3.75 X-Axis (ft)
Factors Of Safety Calculated By The Modified Bishop Method

```
                          ** PCSTABL5M **

                                by
                         Purdue University
-------------------------------------------------------------------------------

                    --Slope Stability Analysis--
                 Simplified Janbu, Simplified Bishop
                    or Spencer's Method of Slices


        Run Date:                 04-20-99
        Time of Run:              5:14pm
        Run By:                   STAN KLINE
        Input Data Filename:      C:ECLSS2E.IN
        Output Filename:          C:ECLSS2E.OUT
        Unit:
        Plotted Output Filename:  C:ECLSS2E.PLT



        PROBLEM DESCRIPTION   THOMPSON CREEK / END OF CONSTRUCTION /
                              LANDSIDE / STATIC - EAST LEVEE



        BOUNDARY COORDINATES

            5 Top   Boundaries
            6 Total Boundaries


        Boundary      X-Left     Y-Left     X-Right     Y-Right    Soil Type
          No.         (ft,m)     (ft,m)      (ft,m)      (ft,m)    Below Bnd

           1             .00      50.00      100.00       50.00        2
           2          100.00      50.00      114.00       57.00        1
           3          114.00      57.00      129.00       57.00        1
           4          129.00      57.00      143.00       50.00        1
           5          143.00      50.00      200.00       50.00        2
           6          100.00      50.00      143.00       50.00        2
-------------------------------------------------------------------------------


       ISOTROPIC SOIL PARAMETERS


         2 Type(s) of Soil


        Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
        Type Unit Wt. Unit Wt. Intercept  Angle  Pressure Constant Surface
         No.    (pcf,KN/m3)    (psf,KPa)  (deg)    Param. (psf,KPa)    No.

          1   130.0    130.0    1000.0       .0     .00         .0      0
          2   120.0    120.0     500.0       .0     .00         .0      0
```

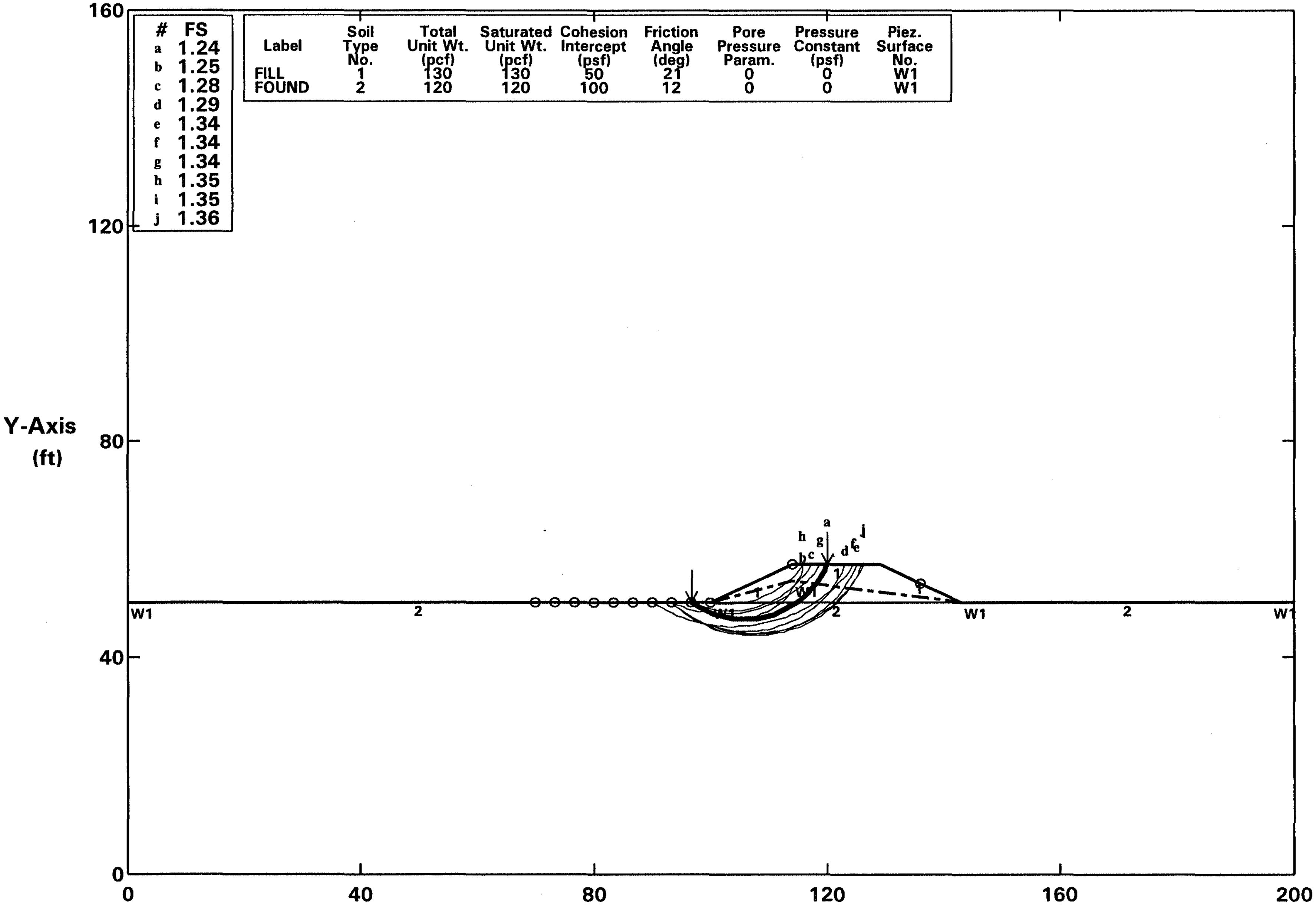
```
--------------------------------------------------------------------------------


          A Critical Failure Surface Searching Method, Using A Random
          Technique For Generating Circular Surfaces, Has Been Specified.


          100 Trial Surfaces Have Been Generated.


           10 Surfaces Initiate From Each Of 10 Points Equally Spaced
          Along The Ground Surface Between  X =  70.00 (ft,m)
                                       and  X = 100.00 (ft,m)


          Each Surface Terminates Between   X = 114.00 (ft,m)
                                      and   X = 136.00 (ft,m)


          Unless Further Limitations Were Imposed, The Minimum Elevation
          At Which A Surface Extends Is  Y = 20.00 (ft,m)


           1.00 (ft,m) Line Segments Define Each Trial Failure Surface.


--------------------------------------------------------------------------------

          Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Examined.  They Are Ordered - Most Critical
          First.


          * * Safety Factors Are Calculated By The Modified Bishop Method * *


          Failure Surface Specified By 51 Coordinate Points


            Point       X-Surf       Y-Surf
             No.        (ft,m)       (ft,m)

              1          90.00        50.00
              2          90.71        49.30
              3          91.45        48.62
              4          92.21        47.97
              5          92.99        47.35
              6          93.80        46.76
              7          94.63        46.20
              8          95.48        45.68
              9          96.35        45.18
             10          97.24        44.72
             11          98.14        44.30
             12          99.06        43.91
             13         100.00        43.55
             14         100.95        43.23
             15         101.90        42.95
```

```
              16         102.87        42.70
              17         103.85        42.49
              18         104.84        42.31
              19         105.83        42.18
              20         106.82        42.08
              21         107.82        42.02
              22         108.82        42.00
              23         109.82        42.01
              24         110.82        42.06
              25         111.81        42.16
              26         112.80        42.28
              27         113.79        42.45
              28         114.77        42.65
              29         115.74        42.90
              30         116.70        43.17
              31         117.65        43.49
              32         118.59        43.84
              33         119.51        44.22
              34         120.42        44.64
              35         121.31        45.09
              36         122.18        45.58
              37         123.04        46.10
              38         123.87        46.65
              39         124.68        47.23
              40         125.47        47.85
              41         126.24        48.49
              42         126.98        49.16
              43         127.70        49.86
              44         128.38        50.59
              45         129.04        51.34
              46         129.67        52.11
              47         130.28        52.91
              48         130.85        53.74
              49         131.38        54.58
              50         131.89        55.44
              51         131.94        55.53

           Circle Center At X =  108.9 ; Y =   68.3  and Radius,   26.4

                ***     3.752   ***



                Individual data on the    54  slices

                         Water  Water     Tie     Tie     Earthquake
                         Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver     Load
 No.  (ft,m) (lbs,kg) (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N)
   1      .7     30.0      .0      .0      .0      .0      .0      .0      .0
   2      .7     92.1      .0      .0      .0      .0      .0      .0      .0
   3      .8    155.8      .0      .0      .0      .0      .0      .0      .0
   4      .8    220.5      .0      .0      .0      .0      .0      .0      .0
   5      .8    285.5      .0      .0      .0      .0      .0      .0      .0
   6      .8    350.3      .0      .0      .0      .0      .0      .0      .0
```

7	.9	414.3	.0	.0	.0	.0	.0	.0	.0
8	.9	476.9	.0	.0	.0	.0	.0	.0	.0
9	.9	537.6	.0	.0	.0	.0	.0	.0	.0
10	.9	595.9	.0	.0	.0	.0	.0	.0	.0
11	.9	651.2	.0	.0	.0	.0	.0	.0	.0
12	.9	703.2	.0	.0	.0	.0	.0	.0	.0
13	.0	1.5	.0	.0	.0	.0	.0	.0	.0
14	.9	778.9	.0	.0	.0	.0	.0	.0	.0
15	1.0	884.0	.0	.0	.0	.0	.0	.0	.0
16	1.0	984.9	.0	.0	.0	.0	.0	.0	.0
17	1.0	1082.5	.0	.0	.0	.0	.0	.0	.0
18	1.0	1176.1	.0	.0	.0	.0	.0	.0	.0
19	1.0	1265.1	.0	.0	.0	.0	.0	.0	.0
20	1.0	1349.0	.0	.0	.0	.0	.0	.0	.0
21	1.0	1427.3	.0	.0	.0	.0	.0	.0	.0
22	1.0	1499.5	.0	.0	.0	.0	.0	.0	.0
23	1.0	1565.1	.0	.0	.0	.0	.0	.0	.0
24	1.0	1623.8	.0	.0	.0	.0	.0	.0	.0
25	1.0	1675.3	.0	.0	.0	.0	.0	.0	.0
26	1.0	1719.2	.0	.0	.0	.0	.0	.0	.0
27	1.0	1755.5	.0	.0	.0	.0	.0	.0	.0
28	.2	377.4	.0	.0	.0	.0	.0	.0	.0
29	.8	1387.0	.0	.0	.0	.0	.0	.0	.0
30	1.0	1724.8	.0	.0	.0	.0	.0	.0	.0
31	1.0	1677.5	.0	.0	.0	.0	.0	.0	.0
32	.9	1624.3	.0	.0	.0	.0	.0	.0	.0
33	.9	1565.5	.0	.0	.0	.0	.0	.0	.0
34	.9	1501.6	.0	.0	.0	.0	.0	.0	.0
35	.9	1433.0	.0	.0	.0	.0	.0	.0	.0
36	.9	1360.2	.0	.0	.0	.0	.0	.0	.0
37	.9	1283.6	.0	.0	.0	.0	.0	.0	.0
38	.9	1203.9	.0	.0	.0	.0	.0	.0	.0
39	.8	1121.7	.0	.0	.0	.0	.0	.0	.0
40	.8	1037.4	.0	.0	.0	.0	.0	.0	.0
41	.8	951.7	.0	.0	.0	.0	.0	.0	.0
42	.8	865.2	.0	.0	.0	.0	.0	.0	.0
43	.7	778.6	.0	.0	.0	.0	.0	.0	.0
44	.7	692.5	.0	.0	.0	.0	.0	.0	.0
45	.1	120.6	.0	.0	.0	.0	.0	.0	.0
46	.6	485.2	.0	.0	.0	.0	.0	.0	.0
47	.6	485.6	.0	.0	.0	.0	.0	.0	.0
48	.0	32.2	.0	.0	.0	.0	.0	.0	.0
49	.6	417.8	.0	.0	.0	.0	.0	.0	.0
50	.6	312.4	.0	.0	.0	.0	.0	.0	.0
51	.6	214.6	.0	.0	.0	.0	.0	.0	.0
52	.5	125.1	.0	.0	.0	.0	.0	.0	.0
53	.5	44.2	.0	.0	.0	.0	.0	.0	.0
54	.0	.4	.0	.0	.0	.0	.0	.0	.0

THOMPSON CREEK / SUDDEN DRAWDOWN / WATERSIDE / STATIC - EAST LEVEE

Ten Most Critical. C:SDWSS6E.PLT By: STAN KLINE 04-20-99 6:38pm



#	FS
a	1.24
b	1.25
c	1.28
d	1.29
e	1.34
f	1.34
g	1.34
h	1.35
i	1.35
j	1.36

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	50	21	0	0	W1
FOUND	2	120	120	100	12	0	0	W1

PCSTABL5M/SI FSmin = 1.24 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

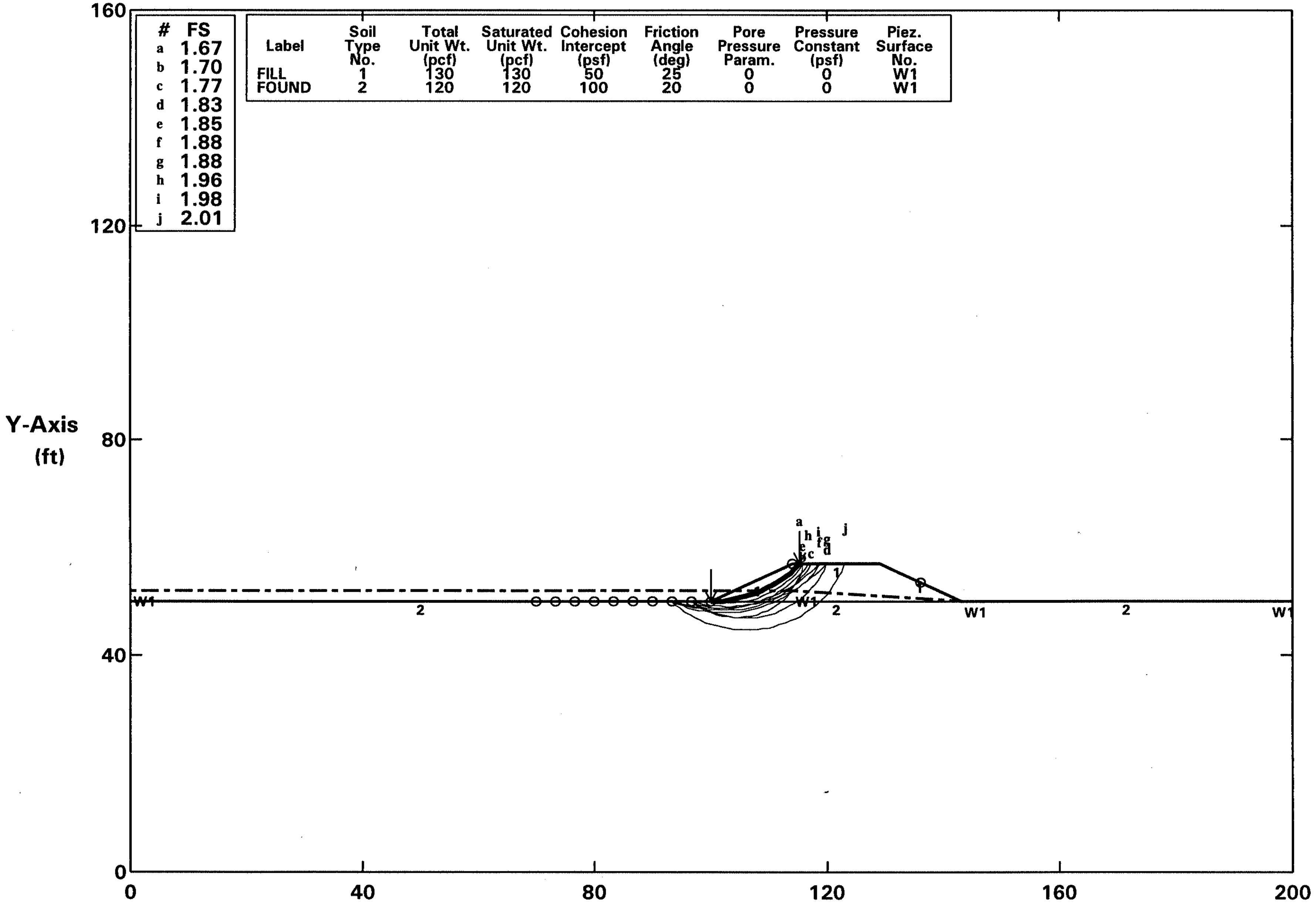
```
                              ** PCSTABL5M **

                                    by
                             Purdue University
--------------------------------------------------------------------------------

                        --Slope Stability Analysis--
                    Simplified Janbu, Simplified Bishop
                       or Spencer`s Method of Slices


          Run Date:                 04-20-99
          Time of Run:              6:38pm
          Run By:                   STAN KLINE
          Input Data Filename:      C:SDWSS6E.IN
          Output Filename:          C:SDWSS6E.OUT
          Unit:
          Plotted Output Filename:  C:SDWSS6E.PLT



          PROBLEM DESCRIPTION   THOMPSON CREEK / SUDDEN DRAWDOWN /
                                WATERSIDE / STATIC - EAST LEVEE



          BOUNDARY COORDINATES

              5 Top   Boundaries
              6 Total Boundaries


          Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
             No.       (ft,m)     (ft,m)      (ft,m)      (ft,m)     Below Bnd

              1            .00     50.00      100.00       50.00         2
              2         100.00     50.00      114.00       57.00         1
              3         114.00     57.00      129.00       57.00         1
              4         129.00     57.00      143.00       50.00         1
              5         143.00     50.00      200.00       50.00         2
              6         100.00     50.00      143.00       50.00         2
--------------------------------------------------------------------------------


         ISOTROPIC SOIL PARAMETERS


           2 Type(s) of Soil


          Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
          Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
           No.    (pcf,KN/m3)    (psf,KPa)   (deg)   Param.  (psf,KPa)   No.

            1   130.0    130.0      50.0     21.0     .00        .0       1
            2   120.0    120.0     100.0     12.0     .00        .0       1
```

```
--------------------------------------------------------------------------------


          1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED


          Unit Weight of Water =  62.40



          Piezometric Surface No.  1 Specified by  5 Coordinate Points

            Point      X-Water     Y-Water
             No.        (ft,m)      (ft,m)

              1            .00       50.00
              2         100.00       50.00
              3         114.00       54.00
              4         143.00       50.00
              5         200.00       50.00
--------------------------------------------------------------------------------


          A Critical Failure Surface Searching Method, Using A Random
          Technique For Generating Circular Surfaces, Has Been Specified.


          100 Trial Surfaces Have Been Generated.


           10 Surfaces Initiate From Each Of 10 Points Equally Spaced
          Along The Ground Surface Between  X =  70.00 (ft,m)
                                       and  X = 100.00 (ft,m)


          Each Surface Terminates Between   X = 114.00 (ft,m)
                                      and   X = 136.00 (ft,m)


          Unless Further Limitations Were Imposed, The Minimum Elevation
          At Which A Surface Extends Is  Y = 20.00 (ft,m)


           1.00 (ft,m) Line Segments Define Each Trial Failure Surface.


--------------------------------------------------------------------------------

          Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Examined.  They Are Ordered - Most Critical
          First.


          * * Safety Factors Are Calculated By The Modified Bishop Method * *
```

```
      Failure Surface Specified By 30 Coordinate Points

        Point        X-Surf        Y-Surf
         No.         (ft,m)        (ft,m)

          1           96.67         50.00
          2           97.48         49.42
          3           98.34         48.90
          4           99.22         48.44
          5          100.14         48.03
          6          101.08         47.69
          7          102.04         47.41
          8          103.01         47.20
          9          104.00         47.05
         10          105.00         46.96
         11          106.00         46.95
         12          107.00         47.00
         13          107.99         47.11
         14          108.97         47.29
         15          109.94         47.54
         16          110.89         47.85
         17          111.82         48.22
         18          112.72         48.66
         19          113.59         49.15
         20          114.43         49.70
         21          115.23         50.30
         22          115.98         50.96
         23          116.69         51.66
         24          117.35         52.41
         25          117.96         53.20
         26          118.52         54.03
         27          119.02         54.90
         28          119.46         55.80
         29          119.84         56.72
         30          119.94         57.00

      Circle Center At X =  105.8 ; Y =   62.0  and Radius,   15.0

              ***     1.236   ***



              Individual data on the    33  slices

                                Water   Water      Tie      Tie     Earthquake
                                Force   Force     Force    Force       Force   Surcharge
Slice   Width    Weight         Top     Bot       Norm     Tan      Hor     Ver     Load
 No.   (ft,m)  (lbs,kg)  (lbs,N) (lbs,N)   (lbs,N)  (lbs,N)  (lbs,N) (lbs,N) (lbs,N)
  1       .8      28.3        .0    18.0        .0       .0       .0      .0      .0
  2       .9      85.8        .0    52.3        .0       .0       .0      .0      .0
  3       .9     141.5        .0    83.1        .0       .0       .0      .0      .0
  4       .8     161.8        .0    92.0        .0       .0       .0      .0      .0
  5       .1      32.5        .0    17.6        .0       .0       .0      .0      .0
  6       .9     278.2        .0   138.8        .0       .0       .0      .0      .0
```

7	1.0	379.4	.0	173.8	.0	.0	.0	.0	.0
8	1.0	476.3	.0	205.2	.0	.0	.0	.0	.0
9	1.0	567.0	.0	233.0	.0	.0	.0	.0	.0
10	1.0	649.7	.0	257.0	.0	.0	.0	.0	.0
11	1.0	722.7	.0	277.2	.0	.0	.0	.0	.0
12	1.0	784.9	.0	293.4	.0	.0	.0	.0	.0
13	1.0	835.0	.0	305.5	.0	.0	.0	.0	.0
14	1.0	872.4	.0	313.5	.0	.0	.0	.0	.0
15	1.0	896.4	.0	317.4	.0	.0	.0	.0	.0
16	1.0	906.8	.0	317.2	.0	.0	.0	.0	.0
17	.9	903.8	.0	312.8	.0	.0	.0	.0	.0
18	.9	887.6	.0	304.3	.0	.0	.0	.0	.0
19	.9	859.0	.0	291.7	.0	.0	.0	.0	.0
20	.4	399.6	.0	136.1	.0	.0	.0	.0	.0
21	.4	413.4	.0	140.1	.0	.0	.0	.0	.0
22	.4	370.5	.0	125.8	.0	.0	.0	.0	.0
23	.4	354.5	.0	114.5	.0	.0	.0	.0	.0
24	.8	625.7	.0	194.7	.0	.0	.0	.0	.0
25	.7	525.5	.0	146.4	.0	.0	.0	.0	.0
26	.7	427.2	.0	95.7	.0	.0	.0	.0	.0
27	.6	332.9	.0	42.6	.0	.0	.0	.0	.0
28	.2	73.7	.0	2.1	.0	.0	.0	.0	.0
29	.4	171.0	.0	.0	.0	.0	.0	.0	.0
30	.5	164.8	.0	.0	.0	.0	.0	.0	.0
31	.4	94.9	.0	.0	.0	.0	.0	.0	.0
32	.4	36.7	.0	.0	.0	.0	.0	.0	.0
33	.1	1.7	.0	.0	.0	.0	.0	.0	.0

THOMPSON CREEK / INTERMEDIATE STAGE / WATERSIDE / STATIC - EAST LEVEE
Ten Most Critical. C:ISWSS8E.PLT By: STAN KLINE 04-20-99 6:44pm



#	FS
a	1.67
b	1.70
c	1.77
d	1.83
e	1.85
f	1.88
g	1.88
h	1.96
i	1.98
j	2.01

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	50	25	0	0	W1
FOUND	2	120	120	100	20	0	0	W1

PCSTABL5M/SI FSmin = 1.67 X-Axis (ft)
Factors Of Safety Calculated By The Modified Bishop Method

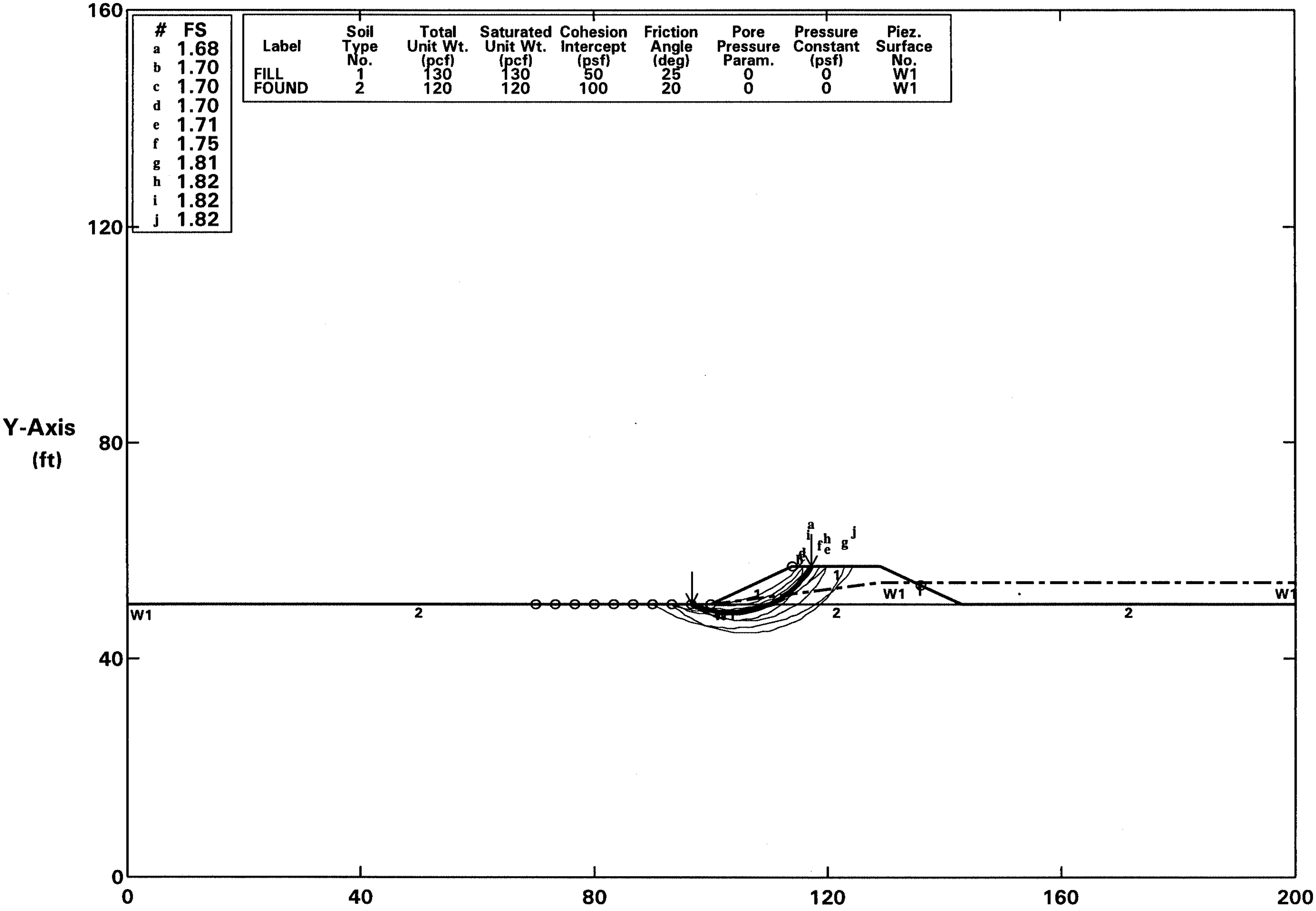
```
                         ** PCSTABL5M **

                               by
                        Purdue University
--------------------------------------------------------------------------------

                    --Slope Stability Analysis--
                Simplified Janbu, Simplified Bishop
                   or Spencer's Method of Slices


          Run Date:                  04-20-99
          Time of Run:               6:44pm
          Run By:                    STAN KLINE
          Input Data Filename:       C:ISWSS8E.IN
          Output Filename:           C:ISWSS8E.OUT
          Unit:
          Plotted Output Filename:   C:ISWSS8E.PLT




          PROBLEM DESCRIPTION   THOMPSON CREEK / INTERMEDIATE STAGE /
                                WATERSIDE / STATIC - EAST LEVEE




          BOUNDARY COORDINATES

              5 Top   Boundaries
              6 Total Boundaries


          Boundary      X-Left      Y-Left     X-Right     Y-Right     Soil Type
            No.         (ft,m)      (ft,m)      (ft,m)      (ft,m)     Below Bnd

             1             .00       50.00      100.00       50.00         2
             2          100.00       50.00      114.00       57.00         1
             3          114.00       57.00      129.00       57.00         1
             4          129.00       57.00      143.00       50.00         1
             5          143.00       50.00      200.00       50.00         2
             6          100.00       50.00      143.00       50.00         2
--------------------------------------------------------------------------------


         ISOTROPIC SOIL PARAMETERS


           2 Type(s) of Soil


          Soil  Total   Saturated  Cohesion Friction    Pore    Pressure   Piez.
          Type Unit Wt. Unit Wt.  Intercept   Angle   Pressure  Constant  Surface
           No.    (pcf,KN/m3)     (psf,KPa)   (deg)    Param.  (psf,KPa)    No.

            1   130.0     130.0      50.0      25.0      .00         .0      1
            2   120.0     120.0     100.0      20.0      .00         .0      1
```

```
--------------------------------------------------------------------------------

          1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

          Unit Weight of Water =  62.40


          Piezometric Surface No.  1 Specified by  4 Coordinate Points

            Point       X-Water     Y-Water
             No.         (ft,m)      (ft,m)

              1             .00       52.00
              2          114.00       52.00
              3          143.00       50.00
              4          200.00       50.00
--------------------------------------------------------------------------------

          A Critical Failure Surface Searching Method, Using A Random
          Technique For Generating Circular Surfaces, Has Been Specified.

          100 Trial Surfaces Have Been Generated.

           10 Surfaces Initiate From Each Of 10 Points Equally Spaced
          Along The Ground Surface Between  X =   70.00 (ft,m)
                                     and  X = 100.00 (ft,m)

          Each Surface Terminates Between   X = 114.00 (ft,m)
                                    and   X = 136.00 (ft,m)

          Unless Further Limitations Were Imposed, The Minimum Elevation
          At Which A Surface Extends Is  Y = 20.00 (ft,m)

           1.00 (ft,m) Line Segments Define Each Trial Failure Surface.

  ------------------------------------------------------------------------------

          Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Examined.  They Are Ordered - Most Critical
          First.

          * * Safety Factors Are Calculated By The Modified Bishop Method * *

          Failure Surface Specified By 19 Coordinate Points
          Point       X-Surf       Y-Surf
           No.        (ft,m)       (ft,m)

            1         100.00        50.00
            2         101.00        50.03
            3         102.00        50.10
            4         102.99        50.23
            5         103.97        50.40
            6         104.95        50.63
            7         105.91        50.90
            8         106.86        51.21
            9         107.79        51.58
           10         108.70        51.99
           11         109.59        52.44
           12         110.46        52.94
           13         111.30        53.48
           14         112.12        54.06
           15         112.90        54.68
           16         113.66        55.34
           17         114.38        56.03
           18         115.06        56.76
           19         115.26        57.00

        Circle Center At X =  100.0 ; Y =   70.2  and Radius,   20.2


              ***     1.672    ***



             Individual data on the    20  slices


                         Water  Water      Tie     Tie     Earthquake
                         Force  Force     Force   Force      Force   Surcharge
Slice  Width   Weight     Top    Bot      Norm     Tan     Hor     Ver     Load
 No.  (ft,m) (lbs,kg) (lbs,N) (lbs,N)  (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N)
  1    1.0     30.7   122.0   123.9       .0      .0      .0      .0      .0
  2    1.0     88.7    87.0   120.7       .0      .0      .0      .0      .0
  3    1.0    139.4    52.1   114.5       .0      .0      .0      .0      .0
  4    1.0    182.5    17.8   105.1       .0      .0      .0      .0      .0
  5    1.0    217.6      .0    92.7       .0      .0      .0      .0      .0
  6    1.0    244.7      .0    77.4       .0      .0      .0      .0      .0
  7     .9    263.6      .0    59.0       .0      .0      .0      .0      .0
  8     .9    274.6      .0    37.8       .0      .0      .0      .0      .0
  9     .9    277.8      .0    13.6       .0      .0      .0      .0      .0
 10     .0      8.1      .0      .0       .0      .0      .0      .0      .0
 11     .9    265.3      .0      .0       .0      .0      .0      .0      .0
 12     .9    262.2      .0      .0       .0      .0      .0      .0      .0
 13     .8    244.4      .0      .0       .0      .0      .0      .0      .0
 14     .8    220.9      .0      .0       .0      .0      .0      .0      .0
 15     .8    192.4      .0      .0       .0      .0      .0      .0      .0
 16     .8    159.7      .0      .0       .0      .0      .0      .0      .0
 17     .3     63.2      .0      .0       .0      .0      .0      .0      .0
 18     .4     56.0      .0      .0       .0      .0      .0      .0      .0
```

19	.7	53.7	.0	.0	.0	.0	.0	.0	.0
20	.2	3.2	.0	.0	.0	.0	.0	.0	.0

THOMPSON CREEK / STEADY SEEPAGE / LANDSIDE / STATIC - EAST LEVEE

Ten Most Critical. C:SSLSS6E.PLT By: STAN KLINE 04-20-99 6:56pm



#	FS
a	1.68
b	1.70
c	1.70
d	1.70
e	1.71
f	1.75
g	1.81
h	1.82
i	1.82
j	1.82

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	50	25	0	0	W1
FOUND	2	120	120	100	20	0	0	W1

PCSTABL5M/SI FSmin = 1.68 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

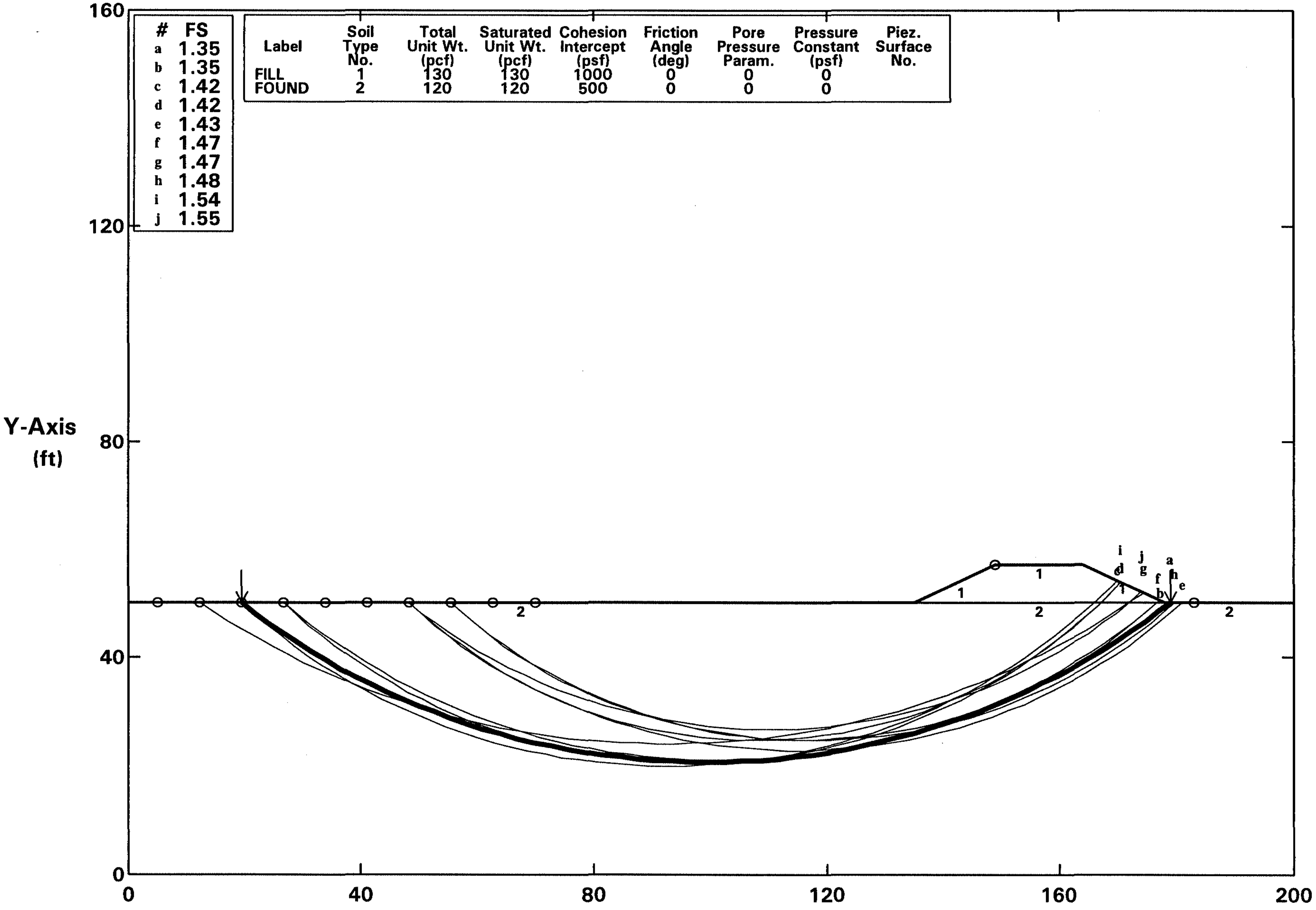
```
                              ** PCSTABL5M **

                                    by
                             Purdue University
--------------------------------------------------------------------------------

                       --Slope Stability Analysis--
                    Simplified Janbu, Simplified Bishop
                       or Spencer`s Method of Slices


          Run Date:                 04-20-99
          Time of Run:              6:56pm
          Run By:                   STAN KLINE
          Input Data Filename:      C:SSLSS6E.IN
          Output Filename:          C:SSLSS6E.OUT
          Unit:
          Plotted Output Filename:  C:SSLSS6E.PLT



          PROBLEM DESCRIPTION   THOMPSON CREEK / STEADY SEEPAGE /
                                LANDSIDE / STATIC - EAST LEVEE



          BOUNDARY COORDINATES

              5 Top   Boundaries
              6 Total Boundaries


          Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
             No.       (ft,m)     (ft,m)     (ft,m)     (ft,m)    Below Bnd

              1           .00      50.00     100.00      50.00        2
              2        100.00      50.00     114.00      57.00        1
              3        114.00      57.00     129.00      57.00        1
              4        129.00      57.00     143.00      50.00        1
              5        143.00      50.00     200.00      50.00        2
              6        100.00      50.00     143.00      50.00        2
--------------------------------------------------------------------------------


         ISOTROPIC SOIL PARAMETERS


           2 Type(s) of Soil


          Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
          Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
           No.    (pcf,KN/m3)    (psf,KPa)   (deg)   Param.  (psf,KPa)   No.

            1   130.0    130.0      50.0     25.0     .00         .0      1
            2   120.0    120.0     100.0     20.0     .00         .0      1
```

```
--------------------------------------------------------------------------------

          1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED


          Unit Weight of Water =  62.40


          Piezometric Surface No.  1 Specified by  4 Coordinate Points

            Point       X-Water      Y-Water
             No.         (ft,m)       (ft,m)

              1            .00        50.00
              2         100.00        50.00
              3         129.00        54.00
              4         200.00        54.00
--------------------------------------------------------------------------------

          A Critical Failure Surface Searching Method, Using A Random
          Technique For Generating Circular Surfaces, Has Been Specified.


          100 Trial Surfaces Have Been Generated.


           10 Surfaces Initiate From Each Of 10 Points Equally Spaced
          Along The Ground Surface Between  X =  70.00 (ft,m)
                                      and  X = 100.00 (ft,m)


          Each Surface Terminates Between   X = 114.00 (ft,m)
                                     and   X = 136.00 (ft,m)


          Unless Further Limitations Were Imposed, The Minimum Elevation
          At Which A Surface Extends Is  Y = 20.00 (ft,m)


           1.00 (ft,m) Line Segments Define Each Trial Failure Surface.

 -------------------------------------------------------------------------------

          Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Examined.  They Are Ordered - Most Critical
          First.


          * * Safety Factors Are Calculated By The Modified Bishop Method * *


          Failure Surface Specified By 25 Coordinate Points
          Point       X-Surf       Y-Surf
           No.        (ft,m)       (ft,m)

            1          96.67        50.00
            2          97.58        49.59
            3          98.52        49.25
            4          99.48        48.97
            5         100.45        48.75
            6         101.44        48.59
            7         102.44        48.50
            8         103.44        48.47
            9         104.44        48.51
           10         105.43        48.61
           11         106.42        48.77
           12         107.39        49.00
           13         108.35        49.30
           14         109.28        49.65
           15         110.19        50.06
           16         111.07        50.54
           17         111.92        51.06
           18         112.74        51.65
           19         113.51        52.28
           20         114.24        52.96
           21         114.93        53.69
           22         115.56        54.46
           23         116.15        55.27
           24         116.68        56.12
           25         117.15        57.00

        Circle Center At X =  103.4 ; Y =   63.9  and Radius,   15.4


               ***     1.679    ***



               Individual data on the    28  slices


                         Water  Water     Tie     Tie     Earthquake
                         Force  Force    Force   Force       Force   Surcharge
Slice  Width   Weight     Top    Bot     Norm     Tan     Hor     Ver     Load
 No.   (ft,m) (lbs,kg) (lbs,N)(lbs,N)  (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N)
  1      .9     22.2      .0    12.6      .0      .0      .0      .0      .0
  2      .9     65.1      .0    36.0      .0      .0      .0      .0      .0
  3     1.0    102.6      .0    55.7      .0      .0      .0      .0      .0
  4      .5     68.3      .0    36.4      .0      .0      .0      .0      .0
  5      .5     72.3      .0    35.5      .0      .0      .0      .0      .0
  6     1.0    218.8      .0    90.5      .0      .0      .0      .0      .0
  7     1.0    299.7      .0   106.6      .0      .0      .0      .0      .0
  8     1.0    372.9      .0   118.9      .0      .0      .0      .0      .0
  9     1.0    437.1      .0   127.1      .0      .0      .0      .0      .0
 10     1.0    491.3      .0   131.3      .0      .0      .0      .0      .0
 11     1.0    534.6      .0   131.4      .0      .0      .0      .0      .0
 12     1.0    566.5      .0   127.5      .0      .0      .0      .0      .0
```

13	1.0	586.6	.0	119.6	.0	.0	.0	.0	.0
14	.9	595.0	.0	107.7	.0	.0	.0	.0	.0
15	.8	499.5	.0	78.8	.0	.0	.0	.0	.0
16	.1	92.2	.0	13.1	.0	.0	.0	.0	.0
17	.9	574.9	.0	72.1	.0	.0	.0	.0	.0
18	.8	546.3	.0	48.6	.0	.0	.0	.0	.0
19	.8	508.4	.0	21.3	.0	.0	.0	.0	.0
20	.2	98.8	.0	.7	.0	.0	.0	.0	.0
21	.6	363.6	.0	.0	.0	.0	.0	.0	.0
22	.5	278.3	.0	.0	.0	.0	.0	.0	.0
23	.2	130.0	.0	.0	.0	.0	.0	.0	.0
24	.7	327.1	.0	.0	.0	.0	.0	.0	.0
25	.6	241.8	.0	.0	.0	.0	.0	.0	.0
26	.6	162.1	.0	.0	.0	.0	.0	.0	.0
27	.5	90.0	.0	.0	.0	.0	.0	.0	.0
28	.5	27.1	.0	.0	.0	.0	.0	.0	.0

THOMPSON CREEK / END OF CONSTRUCTION / WATERSIDE / EARTHQUAKE - EAST LEVEE

Ten Most Critical. C:ECWSE6E.PLT By: STAN KLINE 04-21-99 4:47pm



#	FS
a	1.35
b	1.35
c	1.42
d	1.42
e	1.43
f	1.47
g	1.47
h	1.48
i	1.54
j	1.55

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	1000	0	0	0	
FOUND	2	120	120	500	0	0	0	

PCSTABL5M/SI FSmin = 1.35 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

```
                        ** PCSTABL5M **

                              by
                       Purdue University
--------------------------------------------------------------------------------

                  --Slope Stability Analysis--
              Simplified Janbu, Simplified Bishop
                 or Spencer`s Method of Slices


      Run Date:                   04-21-99
      Time of Run:                4:47pm
      Run By:                     STAN KLINE
      Input Data Filename:        C:ECWSE6E.IN
      Output Filename:            C:ECWSE6E.OUT
      Unit:
      Plotted Output Filename:    C:ECWSE6E.PLT



      PROBLEM DESCRIPTION   THOMPSON CREEK / END OF CONSTRUCTION /
                            WATERSIDE / EARTHQUAKE - EAST LEVEE



      BOUNDARY COORDINATES

          5 Top   Boundaries
          6 Total Boundaries


      Boundary      X-Left     Y-Left    X-Right     Y-Right    Soil Type
         No.        (ft,m)     (ft,m)     (ft,m)      (ft,m)    Below Bnd

          1            .00      50.00     135.00       50.00        2
          2         135.00      50.00     149.00       57.00        1
          3         149.00      57.00     164.00       57.00        1
          4         164.00      57.00     178.00       50.00        1
          5         178.00      50.00     200.00       50.00        2
          6         135.00      50.00     178.00       50.00        2
--------------------------------------------------------------------------------


     ISOTROPIC SOIL PARAMETERS


       2 Type(s) of Soil


      Soil  Total  Saturated  Cohesion Friction    Pore   Pressure   Piez.
      Type Unit Wt. Unit Wt. Intercept   Angle   Pressure Constant Surface
       No.    (pcf,KN/m3)    (psf,KPa)   (deg)    Param. (psf,KPa)   No.

        1   130.0    130.0    1000.0       .0      .00        .0      0
        2   120.0    120.0     500.0       .0      .00        .0      0
```

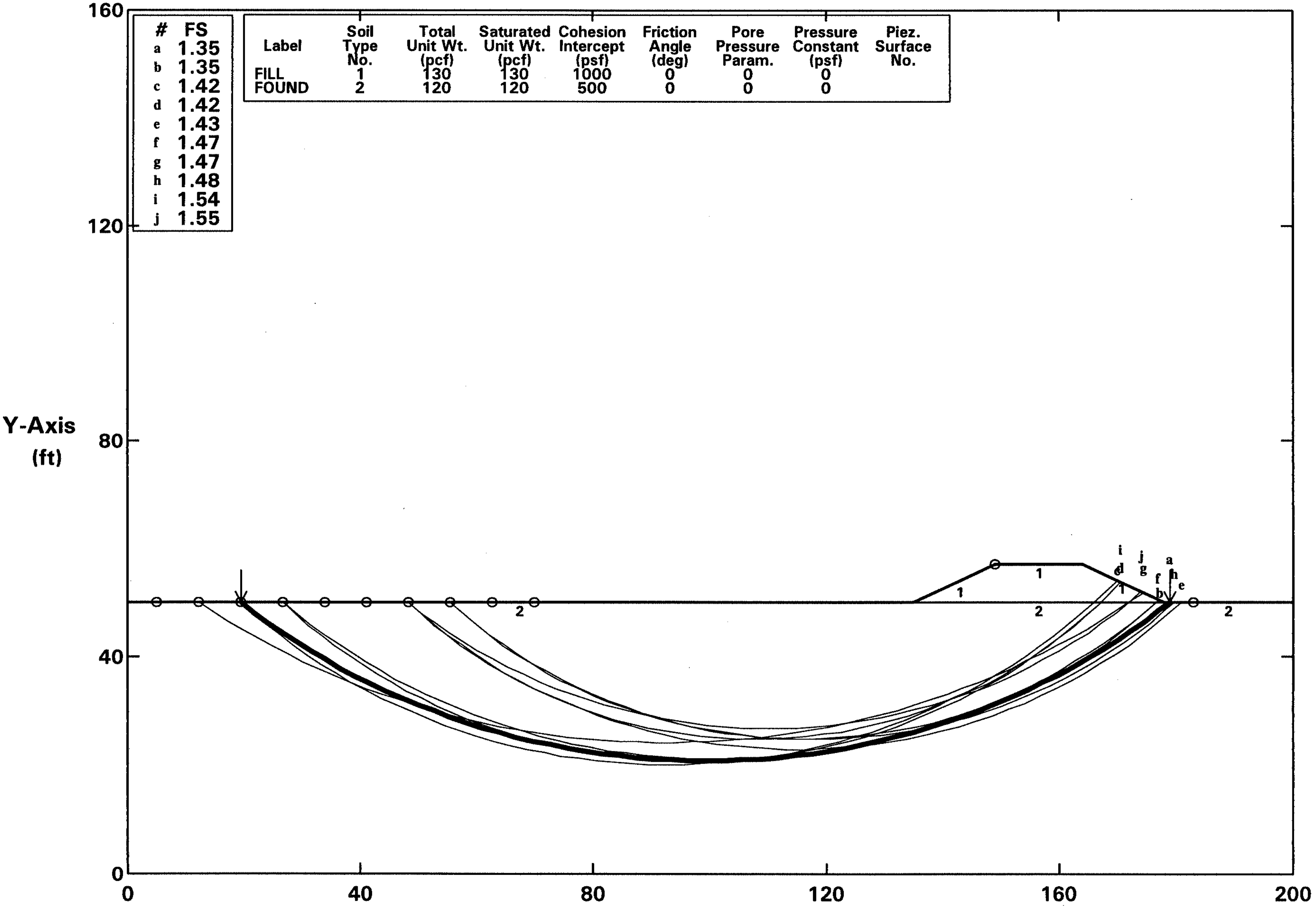
```
         A Horizontal Earthquake Loading Coefficient
         Of .150 Has Been Assigned

         A Vertical Earthquake Loading Coefficient
         Of .000 Has Been Assigned

         Cavitation Pressure =     .0 (psf,KPa)
-------------------------------------------------------------------------------


         A Critical Failure Surface Searching Method, Using A Random
         Technique For Generating Circular Surfaces, Has Been Specified.


         100 Trial Surfaces Have Been Generated.


          10 Surfaces Initiate From Each Of 10 Points Equally Spaced
         Along The Ground Surface Between  X =   5.00 (ft,m)
                                     and   X =  70.00 (ft,m)


         Each Surface Terminates Between   X = 149.00 (ft,m)
                                    and    X = 183.00 (ft,m)


         Unless Further Limitations Were Imposed, The Minimum Elevation
         At Which A Surface Extends Is  Y = 20.00 (ft,m)


          3.00 (ft,m) Line Segments Define Each Trial Failure Surface.


 ------------------------------------------------------------------------------

         Following Are Displayed The Ten Most Critical Of The Trial
         Failure Surfaces Examined.  They Are Ordered - Most Critical
         First.


         * * Safety Factors Are Calculated By The Modified Bishop Method * *



         Failure Surface Specified By 59 Coordinate Points


           Point        X-Surf       Y-Surf
            No.         (ft,m)       (ft,m)

             1           19.44        50.00
             2           21.76        48.09
             3           24.12        46.24
             4           26.52        44.44
             5           28.97        42.70
```

```
     6          31.45        41.03
     7          33.98        39.41
     8          36.55        37.85
     9          39.15        36.36
    10          41.79        34.93
    11          44.46        33.57
    12          47.16        32.27
    13          49.90        31.04
    14          52.66        29.88
    15          55.46        28.78
    16          58.27        27.75
    17          61.12        26.79
    18          63.98        25.90
    19          66.87        25.07
    20          69.77        24.32
    21          72.69        23.64
    22          75.63        23.03
    23          78.58        22.49
    24          81.54        22.03
    25          84.52        21.63
    26          87.50        21.31
    27          90.49        21.06
    28          93.48        20.89
    29          96.48        20.78
    30          99.48        20.75
    31         102.48        20.79
    32         105.48        20.91
    33         108.47        21.10
    34         111.46        21.36
    35         114.44        21.69
    36         117.42        22.09
    37         120.38        22.57
    38         123.33        23.12
    39         126.26        23.74
    40         129.18        24.43
    41         132.08        25.20
    42         134.97        26.03
    43         137.83        26.93
    44         140.67        27.90
    45         143.48        28.94
    46         146.27        30.05
    47         149.03        31.23
    48         151.76        32.47
    49         154.46        33.78
    50         157.12        35.15
    51         159.76        36.59
    52         162.36        38.09
    53         164.92        39.65
    54         167.44        41.28
    55         169.92        42.97
    56         172.36        44.71
    57         174.75        46.52
    58         177.10        48.38
    59         179.05        50.00

Circle Center At X =   99.3 ; Y =  144.3  and Radius,  123.5
```

```
               ***     1.345   ***



              Individual data on the    62  slices

                         Water  Water      Tie     Tie      Earthquake
                         Force  Force     Force   Force        Force    Surcharge
Slice  Width    Weight    Top    Bot      Norm     Tan      Hor      Ver     Load
 No.  (ft,m)  (lbs,kg) (lbs,N)(lbs,N)  (lbs,N) (lbs,N)  (lbs,N)  (lbs,N)  (lbs,N)
  1     2.3     265.1      .0     .0       .0      .0     39.8       .0       .0
  2     2.4     803.1      .0     .0       .0      .0    120.5       .0       .0
  3     2.4    1344.5      .0     .0       .0      .0    201.7       .0       .0
  4     2.4    1887.0      .0     .0       .0      .0    283.0       .0       .0
  5     2.5    2428.5      .0     .0       .0      .0    364.3       .0       .0
  6     2.5    2967.0      .0     .0       .0      .0    445.1       .0       .0
  7     2.6    3500.4      .0     .0       .0      .0    525.1       .0       .0
  8     2.6    4026.6      .0     .0       .0      .0    604.0       .0       .0
  9     2.6    4543.6      .0     .0       .0      .0    681.5       .0       .0
 10     2.7    5049.5      .0     .0       .0      .0    757.4       .0       .0
 11     2.7    5542.6      .0     .0       .0      .0    831.4       .0       .0
 12     2.7    6020.8      .0     .0       .0      .0    903.1       .0       .0
 13     2.8    6482.6      .0     .0       .0      .0    972.4       .0       .0
 14     2.8    6926.1      .0     .0       .0      .0   1038.9       .0       .0
 15     2.8    7349.9      .0     .0       .0      .0   1102.5       .0       .0
 16     2.8    7752.4      .0     .0       .0      .0   1162.9       .0       .0
 17     2.9    8132.2      .0     .0       .0      .0   1219.8       .0       .0
 18     2.9    8487.9      .0     .0       .0      .0   1273.2       .0       .0
 19     2.9    8818.3      .0     .0       .0      .0   1322.7       .0       .0
 20     2.9    9122.2      .0     .0       .0      .0   1368.3       .0       .0
 21     2.9    9398.5      .0     .0       .0      .0   1409.8       .0       .0
 22     3.0    9646.3      .0     .0       .0      .0   1446.9       .0       .0
 23     3.0    9864.7      .0     .0       .0      .0   1479.7       .0       .0
 24     3.0   10053.0      .0     .0       .0      .0   1507.9       .0       .0
 25     3.0   10210.5      .0     .0       .0      .0   1531.6       .0       .0
 26     3.0   10336.6      .0     .0       .0      .0   1550.5       .0       .0
 27     3.0   10431.0      .0     .0       .0      .0   1564.6       .0       .0
 28     3.0   10493.2      .0     .0       .0      .0   1574.0       .0       .0
 29     3.0   10523.2      .0     .0       .0      .0   1578.5       .0       .0
 30     3.0   10520.7      .0     .0       .0      .0   1578.1       .0       .0
 31     3.0   10485.8      .0     .0       .0      .0   1572.9       .0       .0
 32     3.0   10418.6      .0     .0       .0      .0   1562.8       .0       .0
 33     3.0   10319.3      .0     .0       .0      .0   1547.9       .0       .0
 34     3.0   10188.3      .0     .0       .0      .0   1528.2       .0       .0
 35     3.0   10026.1      .0     .0       .0      .0   1503.9       .0       .0
 36     3.0    9833.1      .0     .0       .0      .0   1475.0       .0       .0
 37     2.9    9610.1      .0     .0       .0      .0   1441.5       .0       .0
 38     2.9    9357.9      .0     .0       .0      .0   1403.7       .0       .0
 39     2.9    9077.2      .0     .0       .0      .0   1361.6       .0       .0
 40     2.9    8769.2      .0     .0       .0      .0   1315.4       .0       .0
 41     2.9    8434.8      .0     .0       .0      .0   1265.2       .0       .0
 42      .0      97.2      .0     .0       .0      .0     14.6       .0       .0
 43     2.8    8237.9      .0     .0       .0      .0   1235.7       .0       .0
 44     2.8    8475.4      .0     .0       .0      .0   1271.3       .0       .0
 45     2.8    8579.7      .0     .0       .0      .0   1287.0       .0       .0
 46     2.8    8648.3      .0     .0       .0      .0   1297.2       .0       .0
```

47	2.7	8595.2	.0	.0	.0	.0	1289.3	.0	.0
48	.0	86.5	.0	.0	.0	.0	13.0	.0	.0
49	2.7	8433.2	.0	.0	.0	.0	1265.0	.0	.0
50	2.7	7924.4	.0	.0	.0	.0	1188.7	.0	.0
51	2.7	7399.7	.0	.0	.0	.0	1110.0	.0	.0
52	2.6	6860.8	.0	.0	.0	.0	1029.1	.0	.0
53	2.6	6309.8	.0	.0	.0	.0	946.5	.0	.0
54	1.6	3748.6	.0	.0	.0	.0	562.3	.0	.0
55	.9	1972.7	.0	.0	.0	.0	295.9	.0	.0
56	2.5	4822.3	.0	.0	.0	.0	723.4	.0	.0
57	2.5	3849.0	.0	.0	.0	.0	577.3	.0	.0
58	2.4	2891.7	.0	.0	.0	.0	433.8	.0	.0
59	2.4	1953.4	.0	.0	.0	.0	293.0	.0	.0
60	2.4	1036.7	.0	.0	.0	.0	155.5	.0	.0
61	.9	160.1	.0	.0	.0	.0	24.0	.0	.0
62	1.1	55.3	.0	.0	.0	.0	8.3	.0	.0

THOMPSON CREEK / END OF CONSTRUCTION / LANDSIDE / EARTHQUAKE - EAST LEVEE
Ten Most Critical. C:ECLSE6E.PLT By: STAN KLINE 04-21-99 5:26pm



#	FS
a	1.35
b	1.35
c	1.42
d	1.42
e	1.43
f	1.47
g	1.47
h	1.48
i	1.54
j	1.55

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	1000	0	0	0	
FOUND	2	120	120	500	0	0	0	

PCSTABL5M/SI FSmin = 1.35 X-Axis (ft)
Factors Of Safety Calculated By The Modified Bishop Method

```
                    ** PCSTABL5M **

                          by
                   Purdue University
--------------------------------------------------------------------------------

              --Slope Stability Analysis--
          Simplified Janbu, Simplified Bishop
             or Spencer's Method of Slices


          Run Date:                  04-21-99
          Time of Run:               5:26pm
          Run By:                    STAN KLINE
          Input Data Filename:       C:ECLSE6E.IN
          Output Filename:           C:ECLSE6E.OUT
          Unit:
          Plotted Output Filename:   C:ECLSE6E.PLT




          PROBLEM DESCRIPTION   THOMPSON CREEK / END OF CONSTRUCTION /
                                LANDSIDE / EARTHQUAKE - EAST LEVEE



          BOUNDARY COORDINATES

              5 Top   Boundaries
              6 Total Boundaries

          Boundary     X-Left     Y-Left    X-Right    Y-Right    Soil Type
             No.       (ft,m)     (ft,m)     (ft,m)     (ft,m)    Below Bnd

              1           .00      50.00     135.00      50.00        2
              2        135.00      50.00     149.00      57.00        1
              3        149.00      57.00     164.00      57.00        1
              4        164.00      57.00     178.00      50.00        1
              5        178.00      50.00     200.00      50.00        2
              6        135.00      50.00     178.00      50.00        2
--------------------------------------------------------------------------------


         ISOTROPIC SOIL PARAMETERS


           2 Type(s) of Soil


          Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
          Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
           No.    (pcf,KN/m3)    (psf,KPa)   (deg)   Param. (psf,KPa)    No.

            1   130.0     130.0    1000.0      .0      .00        .0      0
            2   120.0     120.0     500.0      .0      .00        .0      0
```

```
        A Horizontal Earthquake Loading Coefficient
        Of .150 Has Been Assigned

        A Vertical Earthquake Loading Coefficient
        Of .000 Has Been Assigned

        Cavitation Pressure =     .0 (psf,KPa)
-------------------------------------------------------------------------------


        A Critical Failure Surface Searching Method, Using A Random
        Technique For Generating Circular Surfaces, Has Been Specified.


        100 Trial Surfaces Have Been Generated.


         10 Surfaces Initiate From Each Of 10 Points Equally Spaced
        Along The Ground Surface Between  X =   5.00 (ft,m)
                                     and  X =  70.00 (ft,m)


        Each Surface Terminates Between   X = 149.00 (ft,m)
                                    and   X = 183.00 (ft,m)


        Unless Further Limitations Were Imposed, The Minimum Elevation
        At Which A Surface Extends Is  Y = 20.00 (ft,m)


         3.00 (ft,m) Line Segments Define Each Trial Failure Surface.


 ------------------------------------------------------------------------------

        Following Are Displayed The Ten Most Critical Of The Trial
        Failure Surfaces Examined.  They Are Ordered - Most Critical
        First.


        * * Safety Factors Are Calculated By The Modified Bishop Method * *


        Failure Surface Specified By 59 Coordinate Points


          Point       X-Surf       Y-Surf
           No.        (ft,m)       (ft,m)

            1          19.44        50.00
            2          21.76        48.09
            3          24.12        46.24
            4          26.52        44.44
            5          28.97        42.70
```

6	31.45	41.03
7	33.98	39.41
8	36.55	37.85
9	39.15	36.36
10	41.79	34.93
11	44.46	33.57
12	47.16	32.27
13	49.90	31.04
14	52.66	29.88
15	55.46	28.78
16	58.27	27.75
17	61.12	26.79
18	63.98	25.90
19	66.87	25.07
20	69.77	24.32
21	72.69	23.64
22	75.63	23.03
23	78.58	22.49
24	81.54	22.03
25	84.52	21.63
26	87.50	21.31
27	90.49	21.06
28	93.48	20.89
29	96.48	20.78
30	99.48	20.75
31	102.48	20.79
32	105.48	20.91
33	108.47	21.10
34	111.46	21.36
35	114.44	21.69
36	117.42	22.09
37	120.38	22.57
38	123.33	23.12
39	126.26	23.74
40	129.18	24.43
41	132.08	25.20
42	134.97	26.03
43	137.83	26.93
44	140.67	27.90
45	143.48	28.94
46	146.27	30.05
47	149.03	31.23
48	151.76	32.47
49	154.46	33.78
50	157.12	35.15
51	159.76	36.59
52	162.36	38.09
53	164.92	39.65
54	167.44	41.28
55	169.92	42.97
56	172.36	44.71
57	174.75	46.52
58	177.10	48.38
59	179.05	50.00

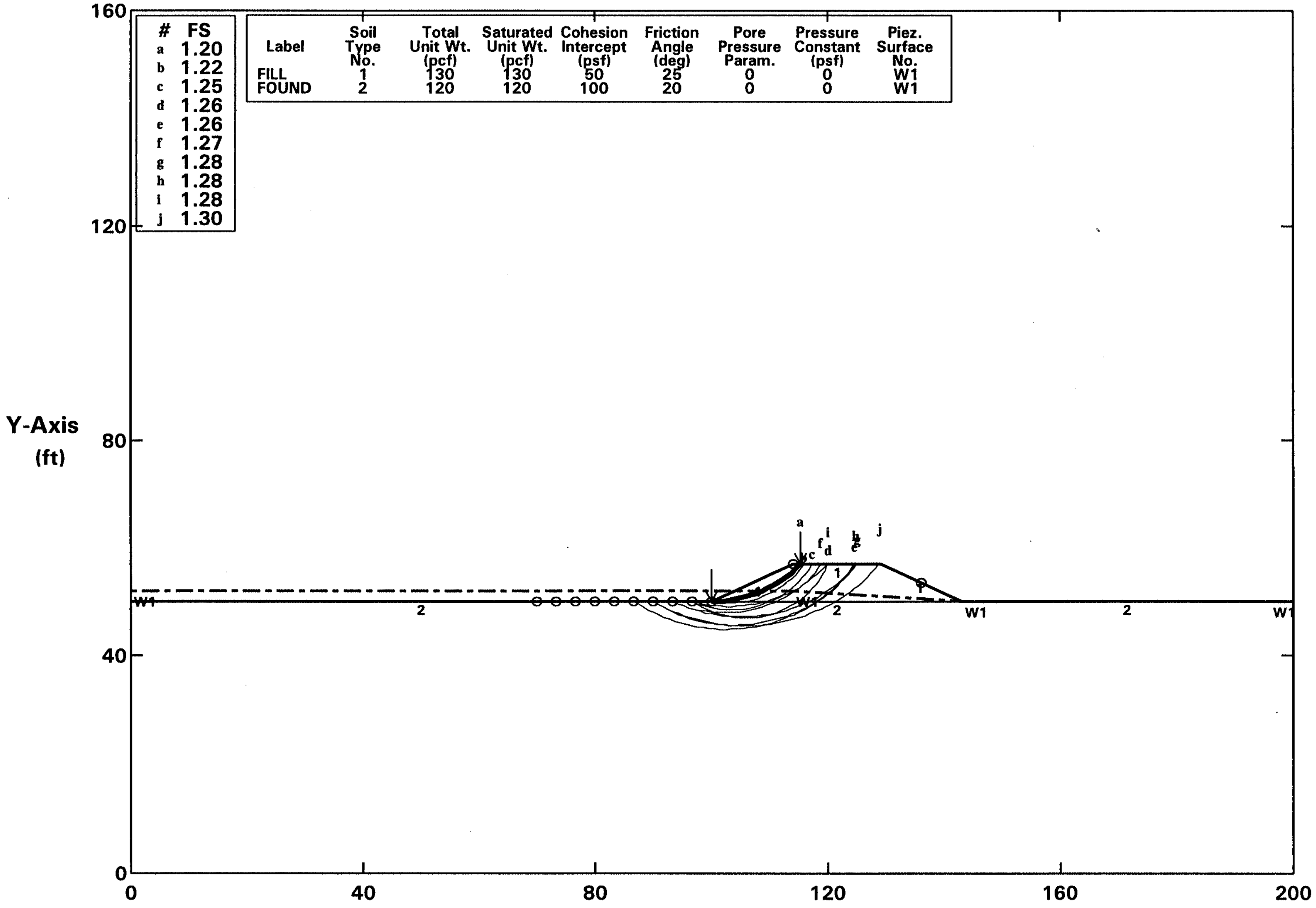
Circle Center At X = 99.3 ; Y = 144.3 and Radius, 123.5

```
                ***     1.345   ***



                Individual data on the    62  slices

                           Water  Water     Tie     Tie      Earthquake
                           Force  Force    Force   Force        Force   Surcharge
 Slice   Width    Weight    Top    Bot      Norm    Tan      Hor     Ver     Load
  No.   (ft,m)  (lbs,kg) (lbs,N)(lbs,N)  (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N)
   1      2.3     265.1     .0     .0       .0      .0     39.8      .0      .0
   2      2.4     803.1     .0     .0       .0      .0    120.5      .0      .0
   3      2.4    1344.5     .0     .0       .0      .0    201.7      .0      .0
   4      2.4    1887.0     .0     .0       .0      .0    283.0      .0      .0
   5      2.5    2428.5     .0     .0       .0      .0    364.3      .0      .0
   6      2.5    2967.0     .0     .0       .0      .0    445.1      .0      .0
   7      2.6    3500.4     .0     .0       .0      .0    525.1      .0      .0
   8      2.6    4026.6     .0     .0       .0      .0    604.0      .0      .0
   9      2.6    4543.6     .0     .0       .0      .0    681.5      .0      .0
  10      2.7    5049.5     .0     .0       .0      .0    757.4      .0      .0
  11      2.7    5542.6     .0     .0       .0      .0    831.4      .0      .0
  12      2.7    6020.8     .0     .0       .0      .0    903.1      .0      .0
  13      2.8    6482.6     .0     .0       .0      .0    972.4      .0      .0
  14      2.8    6926.1     .0     .0       .0      .0   1038.9      .0      .0
  15      2.8    7349.9     .0     .0       .0      .0   1102.5      .0      .0
  16      2.8    7752.4     .0     .0       .0      .0   1162.9      .0      .0
  17      2.9    8132.2     .0     .0       .0      .0   1219.8      .0      .0
  18      2.9    8487.9     .0     .0       .0      .0   1273.2      .0      .0
  19      2.9    8818.3     .0     .0       .0      .0   1322.7      .0      .0
  20      2.9    9122.2     .0     .0       .0      .0   1368.3      .0      .0
  21      2.9    9398.5     .0     .0       .0      .0   1409.8      .0      .0
  22      3.0    9646.3     .0     .0       .0      .0   1446.9      .0      .0
  23      3.0    9864.7     .0     .0       .0      .0   1479.7      .0      .0
  24      3.0   10053.0     .0     .0       .0      .0   1507.9      .0      .0
  25      3.0   10210.5     .0     .0       .0      .0   1531.6      .0      .0
  26      3.0   10336.6     .0     .0       .0      .0   1550.5      .0      .0
  27      3.0   10431.0     .0     .0       .0      .0   1564.6      .0      .0
  28      3.0   10493.2     .0     .0       .0      .0   1574.0      .0      .0
  29      3.0   10523.2     .0     .0       .0      .0   1578.5      .0      .0
  30      3.0   10520.7     .0     .0       .0      .0   1578.1      .0      .0
  31      3.0   10485.8     .0     .0       .0      .0   1572.9      .0      .0
  32      3.0   10418.6     .0     .0       .0      .0   1562.8      .0      .0
  33      3.0   10319.3     .0     .0       .0      .0   1547.9      .0      .0
  34      3.0   10188.3     .0     .0       .0      .0   1528.2      .0      .0
  35      3.0   10026.1     .0     .0       .0      .0   1503.9      .0      .0
  36      3.0    9833.1     .0     .0       .0      .0   1475.0      .0      .0
  37      2.9    9610.1     .0     .0       .0      .0   1441.5      .0      .0
  38      2.9    9357.9     .0     .0       .0      .0   1403.7      .0      .0
  39      2.9    9077.2     .0     .0       .0      .0   1361.6      .0      .0
  40      2.9    8769.2     .0     .0       .0      .0   1315.4      .0      .0
  41      2.9    8434.8     .0     .0       .0      .0   1265.2      .0      .0
  42       .0      97.2     .0     .0       .0      .0     14.6      .0      .0
  43      2.8    8237.9     .0     .0       .0      .0   1235.7      .0      .0
  44      2.8    8475.4     .0     .0       .0      .0   1271.3      .0      .0
  45      2.8    8579.7     .0     .0       .0      .0   1287.0      .0      .0
  46      2.8    8648.3     .0     .0       .0      .0   1297.2      .0      .0
```

47	2.7	8595.2	.0	.0	.0	.0	1289.3	.0	.0
48	.0	86.5	.0	.0	.0	.0	13.0	.0	.0
49	2.7	8433.2	.0	.0	.0	.0	1265.0	.0	.0
50	2.7	7924.4	.0	.0	.0	.0	1188.7	.0	.0
51	2.7	7399.7	.0	.0	.0	.0	1110.0	.0	.0
52	2.6	6860.8	.0	.0	.0	.0	1029.1	.0	.0
53	2.6	6309.8	.0	.0	.0	.0	946.5	.0	.0
54	1.6	3748.6	.0	.0	.0	.0	562.3	.0	.0
55	.9	1972.7	.0	.0	.0	.0	295.9	.0	.0
56	2.5	4822.3	.0	.0	.0	.0	723.4	.0	.0
57	2.5	3849.0	.0	.0	.0	.0	577.3	.0	.0
58	2.4	2891.7	.0	.0	.0	.0	433.8	.0	.0
59	2.4	1953.4	.0	.0	.0	.0	293.0	.0	.0
60	2.4	1036.7	.0	.0	.0	.0	155.5	.0	.0
61	.9	160.1	.0	.0	.0	.0	24.0	.0	.0
62	1.1	55.3	.0	.0	.0	.0	8.3	.0	.0

THOMPSON CREEK / INTERMEDIATE STAGE / WATERSIDE / EARTHQUAKE - EAST LEVEE

Ten Most Critical. C:ISWSE8E.PLT By: STAN KLINE 04-20-99 7:09pm



#	FS
a	1.20
b	1.22
c	1.25
d	1.26
e	1.26
f	1.27
g	1.28
h	1.28
i	1.28
j	1.30

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	50	25	0	0	W1
FOUND	2	120	120	100	20	0	0	W1

PCSTABL5M/SI FSmin = 1.20 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

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                              ** PCSTABL5M **

                                    by
                             Purdue University
--------------------------------------------------------------------------------

                        --Slope Stability Analysis--
                    Simplified Janbu, Simplified Bishop
                       or Spencer's Method of Slices


          Run Date:                  04-20-99
          Time of Run:               7:09pm
          Run By:                    STAN KLINE
          Input Data Filename:       C:ISWSE8E.IN
          Output Filename:           C:ISWSE8E.OUT
          Unit:
          Plotted Output Filename:   C:ISWSE8E.PLT




          PROBLEM DESCRIPTION   THOMPSON CREEK / INTERMEDIATE STAGE /
                                WATERSIDE / EARTHQUAKE - EAST LEVEE




          BOUNDARY COORDINATES

              5 Top   Boundaries
              6 Total Boundaries


          Boundary      X-Left     Y-Left     X-Right     Y-Right     Soil Type
            No.         (ft,m)     (ft,m)      (ft,m)      (ft,m)     Below Bnd

             1             .00      50.00      100.00       50.00         2
             2          100.00      50.00      114.00       57.00         1
             3          114.00      57.00      129.00       57.00         1
             4          129.00      57.00      143.00       50.00         1
             5          143.00      50.00      200.00       50.00         2
             6          100.00      50.00      143.00       50.00         2
--------------------------------------------------------------------------------


         ISOTROPIC SOIL PARAMETERS


           2 Type(s) of Soil


          Soil  Total  Saturated  Cohesion Friction   Pore   Pressure   Piez.
          Type Unit Wt. Unit Wt. Intercept  Angle   Pressure Constant Surface
           No.     (pcf,KN/m3)    (psf,KPa)  (deg)    Param. (psf,KPa)    No.

            1   130.0     130.0      50.0     25.0     .00         .0      1
            2   120.0     120.0     100.0     20.0     .00         .0      1
```

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--------------------------------------------------------------------------------


         1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED


         Unit Weight of Water =  62.40


         Piezometric Surface No.  1 Specified by  4 Coordinate Points

           Point      X-Water     Y-Water
            No.        (ft,m)      (ft,m)

             1           .00        52.00
             2        114.00        52.00
             3        143.00        50.00
             4        200.00        50.00


         A Horizontal Earthquake Loading Coefficient
         Of .150 Has Been Assigned

         A Vertical Earthquake Loading Coefficient
         Of .000 Has Been Assigned

         Cavitation Pressure =     .0 (psf,KPa)
--------------------------------------------------------------------------------

         A Critical Failure Surface Searching Method, Using A Random
         Technique For Generating Circular Surfaces, Has Been Specified.


         100 Trial Surfaces Have Been Generated.


          10 Surfaces Initiate From Each Of 10 Points Equally Spaced
         Along The Ground Surface Between  X =  70.00 (ft,m)
                                     and  X = 100.00 (ft,m)


         Each Surface Terminates Between   X = 114.00 (ft,m)
                                    and   X = 136.00 (ft,m)


         Unless Further Limitations Were Imposed, The Minimum Elevation
         At Which A Surface Extends Is  Y = 20.00 (ft,m)


          1.00 (ft,m) Line Segments Define Each Trial Failure Surface.


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```
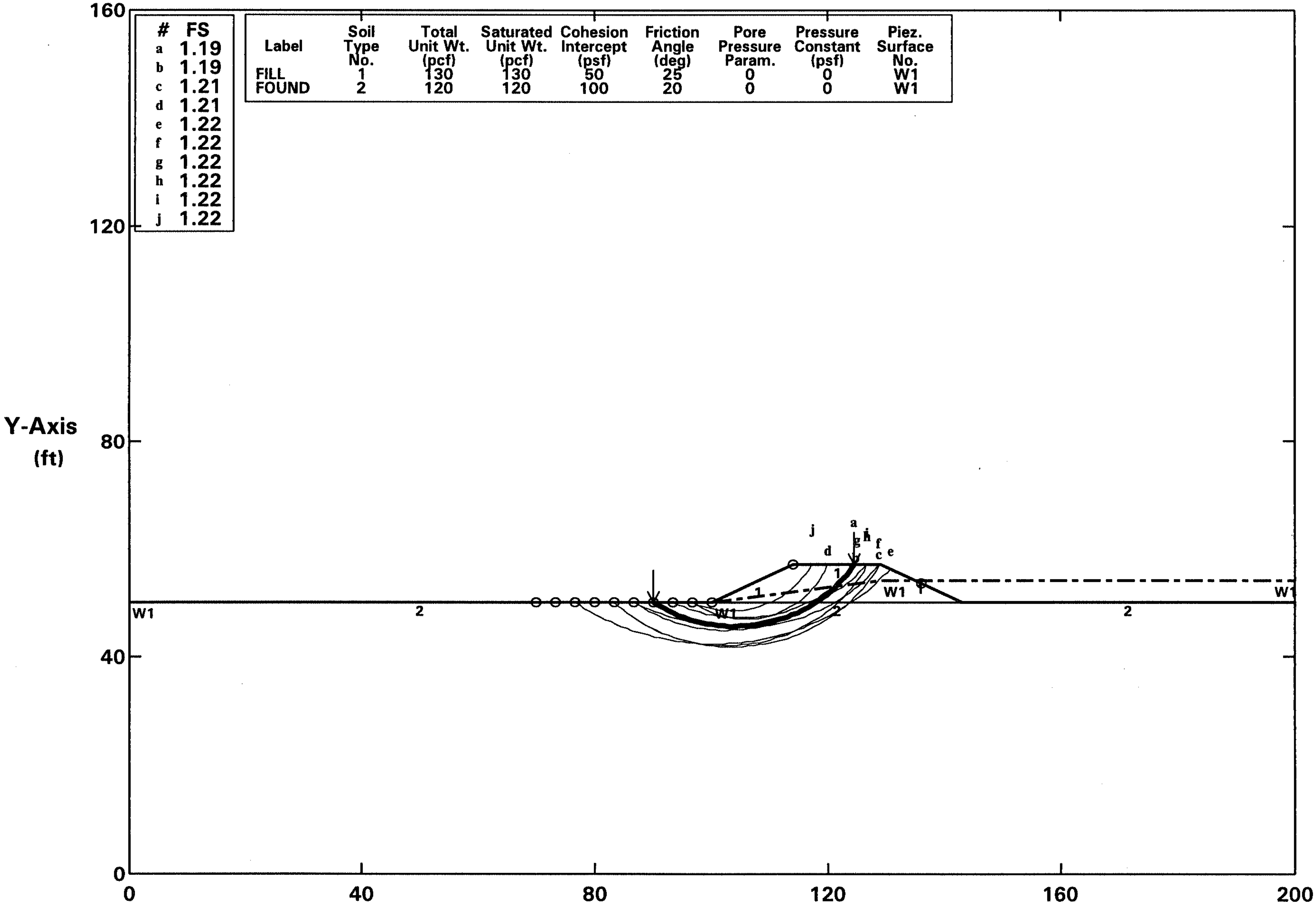

```
          Following Are Displayed The Ten Most Critical Of The Trial
          Failure Surfaces Examined.  They Are Ordered - Most Critical
          First.


          * * Safety Factors Are Calculated By The Modified Bishop Method * *



          Failure Surface Specified By 19 Coordinate Points


            Point        X-Surf       Y-Surf
             No.         (ft,m)       (ft,m)

              1          100.00        50.00
              2          101.00        50.03
              3          102.00        50.10
              4          102.99        50.23
              5          103.97        50.40
              6          104.95        50.63
              7          105.91        50.90
              8          106.86        51.21
              9          107.79        51.58
             10          108.70        51.99
             11          109.59        52.44
             12          110.46        52.94
             13          111.30        53.48
             14          112.12        54.06
             15          112.90        54.68
             16          113.66        55.34
             17          114.38        56.03
             18          115.06        56.76
             19          115.26        57.00

          Circle Center At X =  100.0 ; Y =   70.2  and Radius,   20.2


                ***     1.196   ***




               Individual data on the    20  slices


                        Water  Water      Tie     Tie     Earthquake
                        Force  Force     Force   Force       Force   Surcharge
Slice  Width   Weight    Top    Bot      Norm     Tan     Hor     Ver    Load
 No.  (ft,m) (lbs,kg) (lbs,N) (lbs,N)  (lbs,N) (lbs,N) (lbs,N) (lbs,N) (lbs,N)
  1     1.0     30.7   122.0   123.9       .0      .0     4.6      .0      .0
  2     1.0     88.7    87.0   120.7       .0      .0    13.3      .0      .0
  3     1.0    139.4    52.1   114.5       .0      .0    20.9      .0      .0
  4     1.0    182.5    17.8   105.1       .0      .0    27.4      .0      .0
  5     1.0    217.6      .0    92.7       .0      .0    32.6      .0      .0
  6     1.0    244.7      .0    77.4       .0      .0    36.7      .0      .0
  7      .9    263.6      .0    59.0       .0      .0    39.5      .0      .0
  8      .9    274.6      .0    37.8       .0      .0    41.2      .0      .0
```

9	.9	277.8	.0	13.6	.0	.0	41.7	.0	.0
10	.0	8.1	.0	.0	.0	.0	1.2	.0	.0
11	.9	265.3	.0	.0	.0	.0	39.8	.0	.0
12	.9	262.2	.0	.0	.0	.0	39.3	.0	.0
13	.8	244.4	.0	.0	.0	.0	36.7	.0	.0
14	.8	220.9	.0	.0	.0	.0	33.1	.0	.0
15	.8	192.4	.0	.0	.0	.0	28.9	.0	.0
16	.8	159.7	.0	.0	.0	.0	24.0	.0	.0
17	.3	63.2	.0	.0	.0	.0	9.5	.0	.0
18	.4	56.0	.0	.0	.0	.0	8.4	.0	.0
19	.7	53.7	.0	.0	.0	.0	8.1	.0	.0
20	.2	3.2	.0	.0	.0	.0	.5	.0	.0

THOMPSON CREEK / STEADY SEEPAGE / LANDSIDE / EARTHQUAKE - EAST LEVEE

Ten Most Critical. C:SSLSE6E.PLT By: STAN KLINE 04-20-99 7:16pm



#	FS
a	1.19
b	1.19
c	1.21
d	1.21
e	1.22
f	1.22
g	1.22
h	1.22
i	1.22
j	1.22

Label	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
FILL	1	130	130	50	25	0	0	W1
FOUND	2	120	120	100	20	0	0	W1

PCSTABL5M/SI FSmin = 1.19 X-Axis (ft)

Factors Of Safety Calculated By The Modified Bishop Method

```
                              ** PCSTABL5M **

                                    by
                             Purdue University
--------------------------------------------------------------------------------

                       --Slope Stability Analysis--
                    Simplified Janbu, Simplified Bishop
                       or Spencer's Method of Slices


          Run Date:                 04-20-99
          Time of Run:              7:16pm
          Run By:                   STAN KLINE
          Input Data Filename:      C:SSLSE6E.IN
          Output Filename:          C:SSLSE6E.OUT
          Unit:
          Plotted Output Filename:  C:SSLSE6E.PLT



          PROBLEM DESCRIPTION   THOMPSON CREEK / STEADY SEEPAGE /
                                LANDSIDE / EARTHQUAKE - EAST LEVEE



          BOUNDARY COORDINATES

              5 Top   Boundaries
              6 Total Boundaries


          Boundary     X-Left     Y-Left     X-Right     Y-Right     Soil Type
             No.       (ft,m)     (ft,m)      (ft,m)      (ft,m)     Below Bnd

              1           .00      50.00      100.00       50.00         2
              2        100.00      50.00      114.00       57.00         1
              3        114.00      57.00      129.00       57.00         1
              4        129.00      57.00      143.00       50.00         1
              5        143.00      50.00      200.00       50.00         2
              6        100.00      50.00      143.00       50.00         2
--------------------------------------------------------------------------------


         ISOTROPIC SOIL PARAMETERS


           2 Type(s) of Soil


          Soil  Total  Saturated  Cohesion Friction    Pore   Pressure   Piez.
          Type Unit Wt. Unit Wt. Intercept   Angle  Pressure Constant Surface
           No.    (pcf,KN/m3)     (psf,KPa)  (deg)    Param.  (psf,KPa)    No.

            1   130.0    130.0      50.0     25.0      .00         .0       1
            2   120.0    120.0     100.0     20.0      .00         .0       1
```

```
--------------------------------------------------------------------------------


         1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED


         Unit Weight of Water =  62.40



         Piezometric Surface No.  1 Specified by  4 Coordinate Points


           Point      X-Water     Y-Water
            No.        (ft,m)      (ft,m)

             1           .00       50.00
             2        100.00       50.00
             3        129.00       54.00
             4        200.00       54.00



         A Horizontal Earthquake Loading Coefficient
         Of .150 Has Been Assigned

         A Vertical Earthquake Loading Coefficient
         Of .000 Has Been Assigned

         Cavitation Pressure =     .0 (psf,KPa)
--------------------------------------------------------------------------------


         A Critical Failure Surface Searching Method, Using A Random
         Technique For Generating Circular Surfaces, Has Been Specified.


         100 Trial Surfaces Have Been Generated.


          10 Surfaces Initiate From Each Of 10 Points Equally Spaced
         Along The Ground Surface Between  X =  70.00 (ft,m)
                                     and  X = 100.00 (ft,m)


         Each Surface Terminates Between   X = 114.00 (ft,m)
                                    and   X = 136.00 (ft,m)


         Unless Further Limitations Were Imposed, The Minimum Elevation
         At Which A Surface Extends Is  Y = 20.00 (ft,m)


          1.00 (ft,m) Line Segments Define Each Trial Failure Surface.


--------------------------------------------------------------------------------
```

```
Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined.  They Are Ordered - Most Critical
First.


* * Safety Factors Are Calculated By The Modified Bishop Method * *



Failure Surface Specified By 41 Coordinate Points


  Point        X-Surf       Y-Surf
   No.         (ft,m)       (ft,m)

    1           90.00        50.00
    2           90.83        49.44
    3           91.68        48.92
    4           92.56        48.44
    5           93.45        47.99
    6           94.36        47.57
    7           95.29        47.20
    8           96.23        46.86
    9           97.19        46.57
   10           98.15        46.31
   11           99.13        46.09
   12          100.11        45.91
   13          101.10        45.78
   14          102.10        45.68
   15          103.10        45.62
   16          104.10        45.61
   17          105.10        45.64
   18          106.09        45.70
   19          107.09        45.81
   20          108.08        45.96
   21          109.06        46.15
   22          110.03        46.38
   23          110.99        46.65
   24          111.95        46.96
   25          112.88        47.31
   26          113.81        47.70
   27          114.71        48.12
   28          115.60        48.58
   29          116.47        49.08
   30          117.31        49.61
   31          118.14        50.18
   32          118.94        50.78
   33          119.71        51.41
   34          120.46        52.08
   35          121.18        52.77
   36          121.87        53.49
   37          122.53        54.24
   38          123.16        55.02
   39          123.76        55.82
   40          124.32        56.65
   41          124.54        57.00

Circle Center At X =  103.9 ; Y =   69.9  and Radius,   24.3
```

```
            ***     1.186    ***



            Individual data on the    44  slices

                        Water  Water      Tie      Tie      Earthquake
                        Force  Force     Force    Force        Force   Surcharge
lice  Width   Weight     Top    Bot      Norm     Tan       Hor     Ver     Load
No.  (ft,m) (lbs,kg) (lbs,N)(lbs,N)   (lbs,N)  (lbs,N)  (lbs,N) (lbs,N) (lbs,N)
 1      .8     27.7      .0    17.3       .0       .0      4.2      .0      .0
 2      .9     83.6      .0    51.0       .0       .0     12.5      .0      .0
 3      .9    138.5      .0    82.4       .0       .0     20.8      .0      .0
 4      .9    191.7      .0   111.6       .0       .0     28.8      .0      .0
 5      .9    242.6      .0   138.5       .0       .0     36.4      .0      .0
 6      .9    290.7      .0   163.1       .0       .0     43.6      .0      .0
 7      .9    335.5      .0   185.2       .0       .0     50.3      .0      .0
 8     1.0    376.4      .0   205.0       .0       .0     56.5      .0      .0
 9     1.0    413.1      .0   222.3       .0       .0     62.0      .0      .0
10     1.0    445.2      .0   237.2       .0       .0     66.8      .0      .0
11      .9    417.0      .0   220.3       .0       .0     62.5      .0      .0
12      .1     55.7      .0    29.0       .0       .0      8.3      .0      .0
13     1.0    533.2      .0   262.1       .0       .0     80.0      .0      .0
14     1.0    613.9      .0   277.8       .0       .0     92.1      .0      .0
15     1.0    689.6      .0   291.0       .0       .0    103.4      .0      .0
16     1.0    759.7      .0   301.6       .0       .0    114.0      .0      .0
17     1.0    823.7      .0   309.8       .0       .0    123.6      .0      .0
18     1.0    881.2      .0   315.3       .0       .0    132.2      .0      .0
19     1.0    931.8      .0   318.4       .0       .0    139.8      .0      .0
20     1.0    975.2      .0   318.8       .0       .0    146.3      .0      .0
21     1.0   1011.1      .0   316.7       .0       .0    151.7      .0      .0
22     1.0   1039.5      .0   312.1       .0       .0    155.9      .0      .0
23     1.0   1060.2      .0   304.8       .0       .0    159.0      .0      .0
24     1.0   1073.1      .0   295.1       .0       .0    161.0      .0      .0
25      .9   1078.4      .0   282.8       .0       .0    161.8      .0      .0
26      .9   1076.1      .0   268.0       .0       .0    161.4      .0      .0
27      .2    228.5      .0    55.4       .0       .0     34.3      .0      .0
28      .7    821.5      .0   195.3       .0       .0    123.2      .0      .0
29      .9    982.9      .0   231.0       .0       .0    147.4      .0      .0
30      .9    911.2      .0   208.9       .0       .0    136.7      .0      .0
31      .8    836.7      .0   184.4       .0       .0    125.5      .0      .0
32      .6    525.1      .0   110.6       .0       .0     78.8      .0      .0
33      .3    234.7      .0    46.9       .0       .0     35.2      .0      .0
34      .8    678.1      .0   128.4       .0       .0    101.7      .0      .0
35      .8    594.6      .0    97.0       .0       .0     89.2      .0      .0
36      .7    511.1      .0    63.5       .0       .0     76.7      .0      .0
37      .7    428.5      .0    27.7       .0       .0     64.3      .0      .0
38      .2     89.9      .0     1.1       .0       .0     13.5      .0      .0
39      .5    257.6      .0      .0       .0       .0     38.6      .0      .0
40      .7    269.0      .0      .0       .0       .0     40.3      .0      .0
41      .6    193.7      .0      .0       .0       .0     29.1      .0      .0
42      .6    122.4      .0      .0       .0       .0     18.4      .0      .0
43      .6     55.9      .0      .0       .0       .0      8.4      .0      .0
44      .2      5.0      .0      .0       .0       .0       .7      .0      .0
```

APPENDIX D

SETTLEMENT EVALUATION

CALCULATION SHEET

PAGE 1 OF 2
PROJECT NO. 32921.10100
CLIENT SCVWA
SUBJECT SETTLEMENT
Prepared By
Date 5/24/99
PROJECT THOMPSON CREEK LEVEES
Reviewed By ______ Date ______
Approved By ______ Date ______

LEVEE FOUNDATION CONSOLIDATION PROPERTIES

LOCATION	DEPTH (FT)	P_p[1] (PSF)	P'_o[2] (PSF)	CR[3]	RR[4]	SR[5]
DH-1	8.5-10	1470	1140	0.14	0.01	0.015
DH-2	5.6-7	8000	720	0.12	0.01	0.034
DH-4	19-21	6370	2400	0.12	0.01	0.029
DH-10	13.5-15	4100	1770	0.13	0.01	0.033

[1] PRECONSOLIDATION PRESSURE, FROM LAB TESTING REPORT
[2] EFFECTIVE OVERBURDEN PRESSURE, BASED ON $\gamma_{FILL} = 130$ PCF; $\gamma_{FOUNDATION} = 120$ PCF; ALL ABOVE GROUNDWATER TABLE
[3] COMPRESSION RATIO, FROM LAB TESTING REPORT
[4] RECOMPRESSION RATIO, " " " "
[5] SWELLING RATIO, " " " "

FROM ABOVE, IT IS EVIDENT THAT FOUNDATION MATERIALS ARE OVERCONSOLIDATED

USING RECOMPRESSION PROPERTIES OF THE FOUNDATION MATERIALS, SEE WHAT THE MAGNITUDE OF SETTLEMENT WOULD BE UNDER LOAD OF LEVEE FILL MATERIAL

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CALCULATION SHEET

PAGE 2 OF 2
PROJECT NO. 52921.10100

CLIENT SCVWD
SUBJECT SETTLEMENT
Prepared By Date 5/24/99
PROJECT THOMPSON CREEK LEVEES
Reviewed By Date
Approved By Date

RECOMPRESSION SETTLEMENT UNDER FILL LOAD

$$\Delta H = H_o (RR) \log\left(1 + \frac{\Delta P}{P_o}\right)$$

ΔH = SETTLEMENT, FEET
H_o = LAYER THICKNESS, FEET
RR = RECOMPRESSION RATIO
P_o = INITIAL VERTICAL EFFECTIVE STRESS, PSF
ΔP = CHANGE IN VERTICAL EFFECTIVE STRESS, PSF

H_o : - CLAY FOUNDATION SOILS VARY BETWEEN 20 & 30'
- USE 30'

RR : - 0.01 FROM LAB TESTING

P_o : - GROUNDWATER VARIES 10 - 20', USE 15' AVERAGE
- P_o @ LAYER MIDPOINT = (120)(15) = 1800 PSF

ΔP : - USE 10' FILL @ γ = 130 PCF = 1300 PSF

$$\Delta H = 30 (0.01) \log\left(1 + \frac{1300}{1800}\right)$$

$$= 0.07'$$

$$= \underline{\underline{0.9''}}$$

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